THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIII. No. 564.] LONDON, MARCH 3, 1874. [26TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1838. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
ANTI-GALVANIC PAINT.
FOUR PRIZE MEDALS.
WORKS: BRIXHAM, TORBAY.
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
STEVENS AND CO.,
London Office, 21, Great Winchester Street, E.C.

HENRY SKOINES,
PATENTEE & CONTRACTING GAS ENGINEER
FOR
SETTING RETORTS,
ERECTING AND REMODELLING
GAS-WORKS OF ANY EXTENT,
AT HOME OR ABROAD.
ADDRESS—
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COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Coal Office,
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JOS. COWEN & Co. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL AND CO.,
THE OLD TUBE-WORKS, WEDNESBURY
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
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5, CHARLES STREET, SOHO; and } LONDON
16, SOHO SQUARE,
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
Lists may be obtained on application to
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BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
OF
FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
ESTABLISHED 1830.

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TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
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SCOTTISH CANNEL COAL.
J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.
They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.
Messrs. ROMANS, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.
Analysis, prices, and other information will be forwarded on application to their Offices, 8, Forth Street, EDINBURGH; 1, Walbrook, Mansion House, LONDON, or to the "Crown Wharf," Thomas Street, Limehouse, LONDON, where stocks of house, steam, and gas coal are always on hand.
Coal, machinery, fire goods, &c., shipped to all parts of the world.

THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.

GEORGE GLOVER & CO.,

PATENTEES OF THE
NATIONAL STANDARD GASOMETERS
For the English Government, and for the Government of the Netherlands;
MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW; AND 15, MARKET STREET, MANCHESTER.

G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

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DANIEL HOWARD,

Successor to the late BENJAMIN WHITEHOUSE,

(ESTABLISHED IN 1765,)

BOILER AND GASHOLDER WORKS,

Westbromwich, near Birmingham.

MANUFACTURER OF TELESCOPE AND SINGLE GASHOLDERS,

WROUGHT & CAST IRON TANKS

FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS,

And all kinds of GAS APPARATUS.

Wrought-Iron Roofs, Bridges, and Girders; Steam, Hot Water, and Range Boilers; Tanks, Cisterns, &c.,

And all kinds of Wrought-Iron Work.

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HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS.

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

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CONSUMERS WET METERS,

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EXPERIMENTING METERS, PRESSURE-GAUGES, &c.

WHITEHOUSE AND COMPANY, LIMITED,

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FOR GAS, STEAM, AND WATER;

GAS-FITTERS TOOLS, STEAM COCKS, AND ALL KINDS OF JOINTS.

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FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

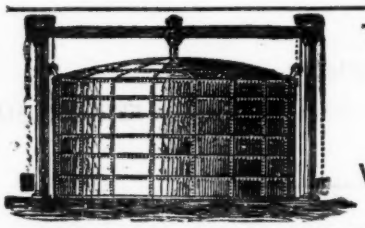
AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

And all kinds of Experimental Gas Apparatus.



W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD

MANUFACTURERS OF

RETORTS, ANNULAR AND PIPE CONDENSERS,

WROUGHT AND CAST IRON SCRUBBERS, PURIFIERS,

GASHOLDERS,

GOVERNORS, AND ALL THE NECESSARY FITTINGS FOR COMPLETING THE ERECTION OF GAS-WORKS.

STATION & CONSUMERS WET OR DRY METERS, STREET & SERVICE MAINS, LAMP COLUMNS & BRACKETS, & WROUGHT-IRON TUBES AND FITTINGS; WROUGHT-IRON ROOFS FOR ANY SIZE OF BUILDINGS.

Sole Makers of B. W. Thurston's Combined Condensing, Scrubbing, and Washing Apparatus,

AND PATENTEES OF THE IMPROVED COMBINED CONDENSING AND PURIFYING APPARATUS SO EMINENTLY ADAPTED FOR EXPORTATION.

REFERENCES TO UPWARDS OF 300 GAS-WORKS.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

THE IMPERIAL METER COMPANY, LIMITED,

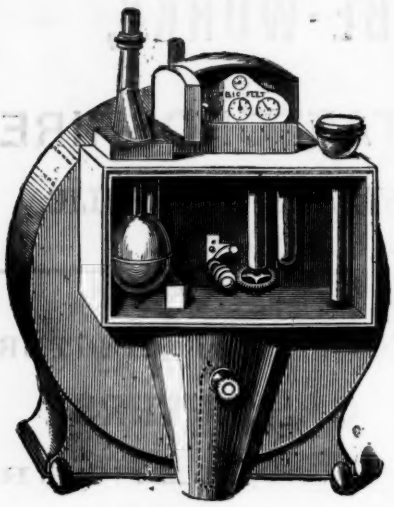
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

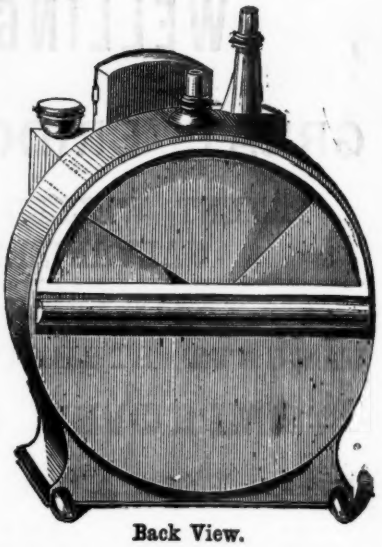
IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.



Back View.

I. **This Meter is more simple in construction than the common non-compensating Meter.**
II. **An unvarying water-line is maintained.**
III. **No amount or kind of pressure will cause it to "flood."**
IV. **It is practically unaffected by "tilting."**
V. **The friction is less than in any other Meter; and**
VI. **It will last for twelve months without requiring to be refilled.**

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

SPECIAL ATTENTION

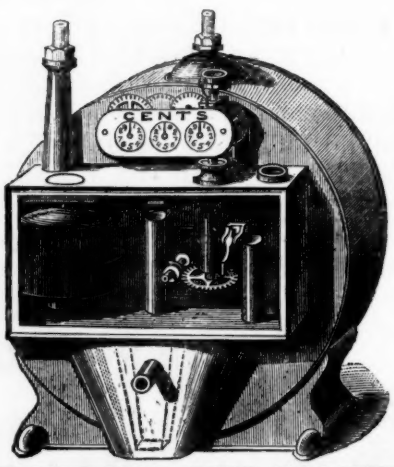
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER.

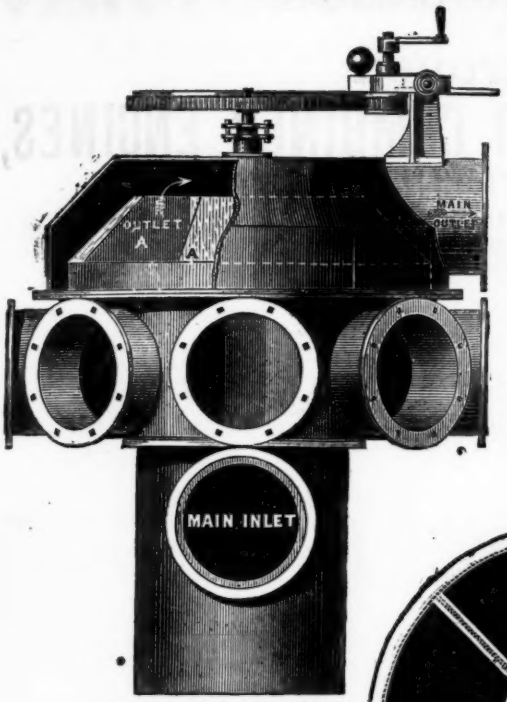
Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

W. MOORE, Secretary.

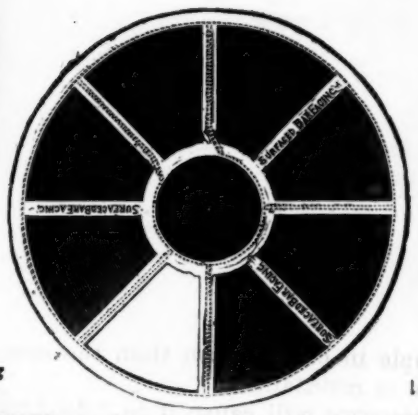
☞ *All Communications to be addressed to the Secretary.*

C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.

Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

WILLEY AND FORD,

GAS ENGINEERS,

WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

ENGINEERING DEPARTMENT.

NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

GASHOLDERS AND TANKS.

RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

METER DEPARTMENT.

They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

GAS-FITTING DEPARTMENT.

An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

☞ PLEASE NOTE THE ADDRESS—

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

GEORGE WALLER & CO.,

GAS ENGINEERS AND CONTRACTORS,

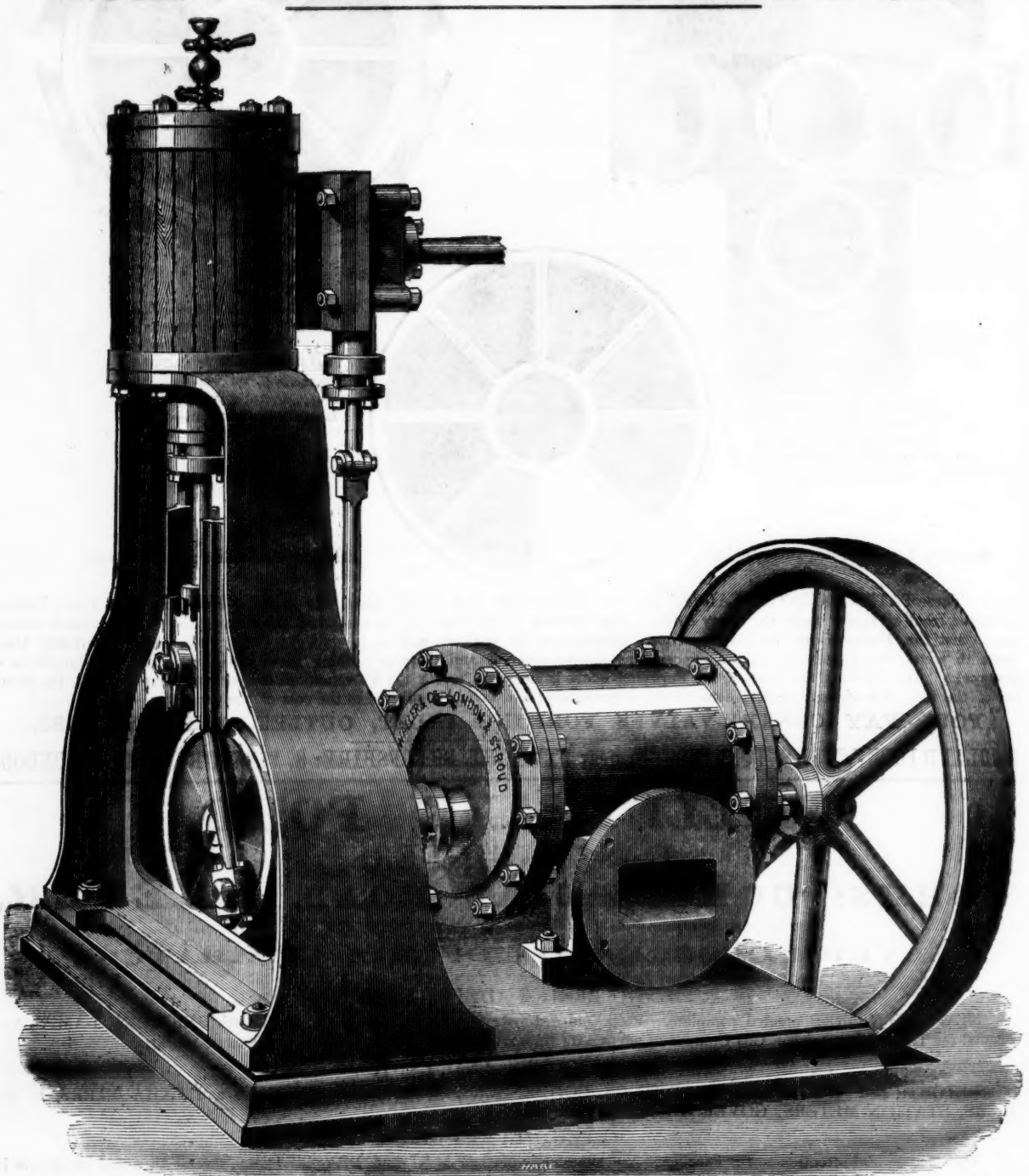
SOLE MAKERS OF

Beale's Improved

PATENT GAS-EXHAUSTERS AND COMBINED ENGINES,

ON ONE BASE PLATE.

NOTE.—The Exhausters are extra large for moderate speed.



This COMBINED VERTICAL ENGINE and EXHAUSTER was specially designed by G. WALLER AND CO. for small works, where space is an object, and is applicable for Exhausters from 1000 to 15,000 per hour. This is the *only* Engine and Exhauster **complete on one Base Plate,** requiring only one foundation.

NOTE.—They are sent away complete, and are easily fixed.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, SOUTHWARK, S.E.,

AND AT

STROUD, GLOUCESTERSHIRE.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

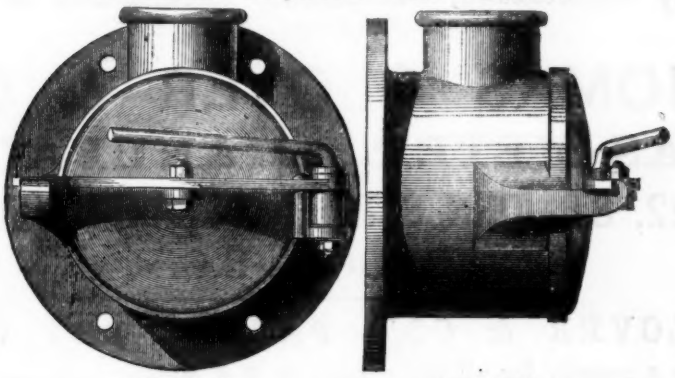
HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 10,000 IN USE.

NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW. SIDE VIEW.

SIMPLE.

ECONOMICAL

DURABLE

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

These Lids are Adopted by the following (among many other) Gas Companies:—

The Gaslight Company, Beckton (where over 2000 are in use).
" Gaslight Company, Bow Common.
" London Gaslight Company.
" Independent Gaslight Company.
" Phœnix Gaslight Company.
" South Metropolitan Gaslight Co.
The West Ham Gas Company.
" Imperial Gaslight Company.
" Gas-Works, Arsenal, Woolwich.
" Commercial Gas Company.
" Alliance and Dublin Gas-Works.
" Edinburgh Gas-Works.
" Manchester Corporatn. Gas-Works.
The Salford Corporation Gas-Works.
" Rochdale Corporation Gas-Works.
" Liverpool United Gas-Works.
" Birkenhead Gas-Works.
" Birmingham Gas-Works.
" Nottingham Gas-Works.
" Newcastle-on-Tyne Gas-Works.
The Carmarthen Gas-Works.
" Merthyr Tydfil Gas-Works.
" Ystrad Gas-Works.
" St. Alban's Gas-Works.
" Over Darwen Gas-Works.
" Aylesbury Gas-Works.
" Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

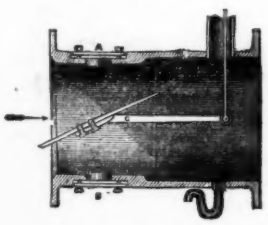
The following important Testimonial, among others, has been given:—

"*The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov.* 14, 1871.

"Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) "F. J. EVANS."

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

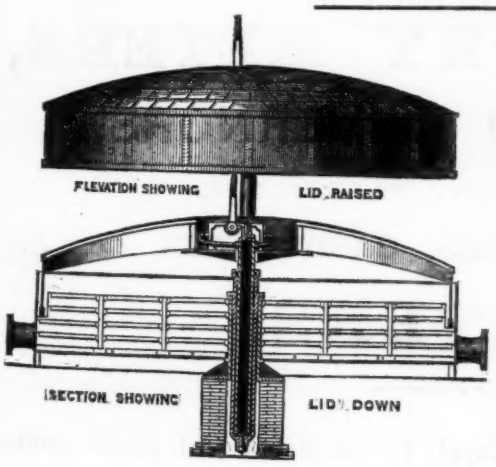
The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Company—a 24 in. at Whitechapel District Station.
" " a 36 in. at Goswell Road Station.
" " a 24 in. at " "
" " a 24 in. at the Gas-Works, Beckton.
The Gaslight Company—a 6 in. at the Gas-Works, Beckton.
The London Gas Company—an 18 in. at the Gas-Works, Nine Elms.
" " an 8 in. at " "
" " a 24 in. at " "

Also at the Gas-Works, Rochdale, Monmouth, Devonport, Cannes, and Mentone (France), &c.



PATENT SELF-CONTAINED

DIRECT HYDRAULIC LIFT

FOR PURIFIER LIDS

REQUIRES NO TRAVELLERS, CRANES, CHAINS, OR OTHER GEAR.

SAFE, SIMPLE, AND DURABLE.

ANY SIZE LID MAY BE RAISED BY ONE MAN

Eight Hydraulic Lifts have been applied at Beckton Gas-Works to raise the Covers of the large Check Purifiers, which are 40 feet diameter, during the past three years, with perfect success.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
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TO CORRESPONDENTS.

TOBIAS.—*The reason that the flame of a Bunsen burner is non-luminous, is tha the heat of the flame is so intense that the particles of carbon are instantly consumed, and do not remain in the incandescent state. An index of the* JOURNAL OF GAS LIGHTING *for* 1873 *was given in the last number for that year.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 3, 1874.

Circular to Gas Companies.

THE commissioners for revising the price of gas have finished the proceedings, so far as the case of the Imperial Company is concerned, and now we have only to wait a few days to learn what addition to 3s. 9d. they will grant. Although only two other companies—the Chartered and the South Metropolitan—are practically interested in the matter, and they only remotely, the whole gas world will look with curiosity for the decision of the commissioners, as to the legality of making up the reserve-fund of the Company to its full amount in one year. The last Acts, relating to the metropolitan gas companies, are typical specimens of legislation, and we should be glad to see some of the provisions of these Acts extended to all gas companies. Country statutory companies, left to the untender mercies of the Gas and Water Works Facilities Act Amendment Act, may naturally look with envy on their more fortunate metropolitan brethren, and may well bestir themselves to obtain an equal consideration at the hands of the Legislature.

The proceedings in the case of the Chartered Company will commence on the 12th inst., in the same place (committee-room A, House of Lords), and the commissioners announce that they will sit on the two following days also, if necessary. We have an impression that the inquiry will be short, the ground having been so thoroughly cleared by the proceedings last year.

Having regard to the possibility of further general legislation for gas companies, it is of some little importance to note the appointment of Sir Charles Adderley to the post of President of the Board of Trade. We should have preferred to see him at the head of the Local Government Board—an appointment for which he would seem to be much better qualified. We are not, however, disposed to think that gas companies will receive harsher treatment at his hands than they received from his predecessor. In our opinion, the President of the Board of Trade should be a *tradesman*, who would give trade interests proper consideration, and not a mere politician or a *doctrinaire*, who will, for the most, only fall into the routine of the office, and become, to a great extent, a mere instrument in the hands of the permanent officers.

Among other changes, we have particularly to regret the loss to the House of Commons of Mr. E. H. J. Craufurd, the late member for the Ayr Burghs. By an error, caused by the similarity of sound of the two names, the credit due to this gentleman, for taking a prominent and successful part in defence of the interests of gas and water companies, was, in a recent number, we regret to say, transferred to a late member for the City of London. Besides the important modifications of the Municipal Corporations (Borough Funds) Act, before alluded to, it ought to be remembered that the shape in which the Metropolis Water Act, 1871, eventually passed, was moulded by the select committee, to which the Bill was referred, on Mr. Craufurd's motion. We do not, at the present moment, see who is to take Mr. Craufurd's place in the new Parliament; but, in a House fuller than usual with commercial men, there will, no doubt, be found some one to stand up in opposition to the general confiscation which a misled public opinion seems to demand.

We are glad to see that the Corporation of Cork have agreed to submit to arbitration their dispute with the gas company respecting the price to be charged for public lights. It is still more gratifying to see that two commercial men have been selected as arbitrators. By such men, disputes of this kind ought to be easily adjusted, to the satisfaction of both parties; and such a selection points once more to the desirability of the formation of Chambers of Commerce for the adjudication of all purely trade disputes.

We lately suggested to the Corporation of Bradford that they might apply the profits of the gas undertaking to the abolition of the lamp-rate, and so simplify their accounts, while making a perfectly legitimate application of the money. We notice now that the Abergavenny Commissioners, who have been very successful in the management of their gas undertaking, have already adopted the plan we suggested, and no lighting-rate is known in their district. The surplus profits of corporate gas undertakings may be rightfully employed in defraying the expenses of public lights, but anything beyond this should, we contend, go in reduction of the price of gas to private consumers.

The "chronic disaffection" in Swansea, we find, is a matter easily explained. We were kindly supplied with everything that is said against the gas company, and drew the natural inference that there is in Swansea a strong feeling that the company have been somewhat remiss in fulfilling their obligations to the public. It turns out, however, to be otherwise. The delay in lighting certain remote public lamps is owing to the remissness of a Local Board in not supplying lanterns to the posts already fitted with pipes, &c., by the gas company. The general public in Swansea, and the Corporation, are well satisfied with the doings of the company, and the suggestion of a rival only emanates from the fertile brain of a newspaper writer. The new chairman of the company is an alderman of the Corporation, who may be depended upon for seeing that all the obligations of the company are faithfully fulfilled.

The Chelsea Vestry have resolved to collect evidence against the Imperial Gas Company, for creating a nuisance at the Fulham works. We have a strong suspicion that the nuisance is grossly exaggerated, and that the proceedings are only taken to embarrass the company. The medical officer of the vestry had the curiosity to attend the unloading of a purifier, and, of course, perceived a bad smell on the spot; but it is impossible to believe that the manager of the works would allow foul lime to remain so as to be a nuisance to the neighbourhood. If it cannot be removed at once, it can easily be covered up with the weathered material, which will effectually prevent the escape of sulphuretted hydrogen.

We have repeatedly urged on gas companies the advisability of their taking a greater interest in their consumers fittings (unfortunately they have no control over them), as a means of preventing a majority of the complaints that are made of bad gas, want of pressure, &c. We publish to-day, with pleasure, a letter from Mr. Marks, the able secretary of the Sheppy Gas Company, showing the excellent results his company have obtained by hiring out fittings to small consumers. The profit obtained by the company has been very considerable, and the blessing of a gaslight, which involves no trouble and next to no risk, at the cost of 1d. per burner per night, must be fully appreciated by the intelligent poorer classes. The plan adopted at Sheerness would largely increase the consumption of gas in most country places, and in the metropolis also. We hope the company will go a step farther, and let on hire small gas cook-

ing apparatuses, which would be a great boon in the summer season.

The Ratcliff Gas Company pursue, almost of necessity, a very prosperous career; but they have felt the pressure of the times, and have been compelled to dip into their reserve-fund, to make up the full dividend for the past half year. The statement of Mr. Jones, than whom no one is more competent to form an opinion, that the price of coke cannot be relied on to recoup a gas company for any advance in the price of coal, is worthy of all attention at the present moment. Every one, who knows anything about the matter, is well aware that coke is now a drug in the market, hard to get rid of at all, and, in any case, commanding a very low price; but gas companies still pay, and will continue to pay, a high price for coal.

We publish to-day a letter, from an eminent authority, in reply to a query which was made in our columns in the number for July 1 last year. The answer is theoretically perfect, but, as we said at the time, the actual registrations of the two meters will depend on the relative perfection of the two instruments. Supposing, however, the instruments to be perfect, our correspondent establishes, that a volume of gas measured at one level will be increased by one-seventh per cent. at the elevation of 100 feet.

The Barnet Gas Company have effected a compromise with the Patent Gas Company, who will move out of the works on the 31st inst., instead of November next, leaving the Barnet Company to recommence the manufacture of gas on the old plan. The engagement must have been remarkably advantageous to the Barnet Company, who, while coal has been so dear, have been supplied with gas, at the expense of the Patent Gas Company, for 1s. 4d. and 2s. per 1000 feet. Consumers in the district, however, have received no benefit by the arrangement, in either price or quality. The gas, we have been told, has been exceedingly bad, both as regards illuminating power and purity. With the cessation of the Barnet contract, it may be expected that the Patent Gas Company will cease to exist as manufacturers, and a winding-up order will, no doubt, soon be sought.

GAS AND WATER BILLS FOR 1874.

Besides the Bills, abstracts of which we have already given, there are some relating to conjoined gas and water undertakings, and these we now proceed to notice.

The *Hartlepool Gas and Water Bill* is promoted by the Hartlepool Gas and Water Company, in order to obtain power to enlarge their present reservoir, and construct another by impounding the water of a stream known as the Hart Burn. No additional capital is asked for.

The *Leeds Corporation Water, Gas, and Improvement Bill* is first to extend the limits of the water supply, and fix rates for the supply of water to houses with and without water-closets. Houses without closets may be supplied at from 7½ to 5 per cent. on the annual value. With one closet, 10s. 6d. per annum additional may be charged, and for every closet in addition, 5s. 3d. per annum. The Bill contains a definition of the words "annual "value." It says, "the water-rent shall be payable according to "the annual amount of the actual rack-rent or value of the pre-"mises." Power is asked to borrow a further sum of £300,000 for the purposes of the water undertaking, which is, as usual, to be repaid by means of a sinking-fund. Some ordinary powers for the prevention of waste and misuse are applied for, and the Corporation seek authority to supply fittings. The Bill is also to extend the limits of the gas supply, and to raise the maximum price to 5s. per 1000 feet within the borough, and 6s. beyond.

The Neath Corporation promote a Bill to authorize the purchase of the gas and water undertakings of the district, by agreement or by arbitration, for a gross sum, or by way of annuities to shareholders. In the case of the gas company, the mortgage debt is to remain a first charge on the undertaking. All necessary arrangements for the transfer are made. The Corporation are to supply 14-candle gas for a price not exceeding 5s. 6d. per 1000 feet, and they are to appoint an examiner, who is to test the gas at least once a week. The water-rate is not to exceed 5 or 6 per cent. on the annual value, with 5s. a year for every closet more than one, and 6s. for every bath. Water for manufacturing purposes is to be supplied by agreement. The Corporation ask power to borrow £80,000 in respect of the two undertakings, to be repaid by means of a sinking-fund in the course of 80 years. A depreciation-fund for the combined undertaking is to be formed, which is, however, never to exceed £1000. Surplus profits from both undertakings may be applied for general public purposes.

The *Nottingham Gas and Water Bill* is promoted by the Corporation of the borough of Nottingham, to effect the confiscation of the gas and water companies. The Bill proposes to enact that, upon notice within 12 months, the companies shall sell, and the Corporation shall purchase, the undertakings of both companies, upon such terms as may be agreed upon, or be settled by arbitration. All necessary provisions are made in the event of the purchase being made by the payment of a gross sum, or the granting of annuities. It is proposed that the Acts relating to the two companies shall apply to the Corporation, and no fresh obligations be imposed. Money borrowed is to be repaid by means of a sinking-fund within 100 years after the same is borrowed. It is proposed that surplus profits may be applied in such a manner as the Corporation think best for the improvement of the borough and the public benefit of the inhabitants. The Corporation seek power to borrow any amount of money they may think requisite for the execution of the Act, if the Bill should pass.

The Ulverston Local Board promote a general Improvement Bill, which, among other things, is to enable them to acquire the undertakings of the Ulverston Gas Company and the Ulverston Water Company. The consideration, in the case of the gas company, is 10 per cent. perpetual annuities to the holders of original stock, and 7 per cent. to the holders of share capital, such annuities to be redeemable (without consent) by the payment of 24 years purchase. The gas supplied by the Local Board is to have the illuminating power of 14 candles, tested by a 15-hole Argand or other approved burner. The company's Act is to apply to the Board, and no alteration is made in the maximum price, which is now 6s. per 1000 feet, and the company have been supplying 18-candle gas. The consideration for the transfer of the water undertaking is a lump sum of £19,600, with interest at the rate of 5 per cent. from the vesting period to the date of payment. All necessary provisions are made for the dissolution of the two companies. The Board seek power to borrow £10,000 in respect of the gas undertaking, and £20,000 in respect of the water, and any further sum necessary if the Board elect to redeem the gas annuities within 12 months of the passing of the Act. The sinking-fund is to be sufficient to pay off the borrowed money in 60 years. Here, again, it is proposed to allow the application of surplus profits to general public purposes.

The *Wigan Improvement Bill* has been already referred to, and we need not again notice it until it becomes law.

The *Ystrad Gas and Water Bill* is promoted by the Ystrad Gas and Water Company (and therefore should have been noticed before) to obtain an extension of time for the completion of new gas-works, and to raise the maximum price of gas to 6s. per 1000 within a part of their district, and 7s. 6d. in another part.

Two Bills remain to be noticed, promoted by local authorities for power to make water-works and construct sewage-works.

The Horbury Local Board promote a Bill to confirm an agreement made for taking a supply of water from the Soothill Local Board, who, in their turn, buy the water from the Halifax Corporation. The first-named Board is to pay the second-mentioned 11d. per 1000 gallons for the water. The necessary works are only a meter-house and distributing-pipes. The Horbury Board further seek power to construct sewers, and to take land for the utilization of sewage by irrigation or otherwise, as they may see fit. They ask authority to borrow for the purposes of the Bill a sum of £40,000, which will be a considerable debt for a population of little more than 4000. Water-rents are to be payable in advance. They will amount to 10 or 7 per cent., according as the annual value of the house is under or above £20. Every closet is to be charged 10s. per annum, and every bath a like sum.

The *Hythe Improvement and Water-Works Bill* is to transfer powers hitherto exercised by Town Commissioners to the Corporation of the borough, to enable the Corporation to make various improvements in the borough, and to empower them to sink an additional well, and improve the water supply. The Bill will authorize the Corporation to inspect all private wells in the borough, and have the water analyzed; and if it be reported unfit for use, the Corporation may take away the pump, and fill up and cover the well. The water-rates will vary from 6 to 4½ per cent. on the rateable value. The charge for one closet will be 3s. or 5s. per annum according to value, and for every additional closet 5s. per annum. Baths will be charged 10s. a year. Full powers are asked for the prevention of waste, misuse, and contamination of the water; but there are no unusual provisions except the one we have noticed relating to the inspection of private wells.

WATER AND SANITARY NOTES.

To assist the owners and ratepayers in forming an opinion, and preparatory to the poll of the borough, which is to take place this week, the Water Committee of the Corporation of Liverpool have published and circulated a statement in support of the Water Bill they are promoting. They say that the whole quantity of water now available in dry seasons is 120½ millions of gallons weekly, but, when the new reservoir is in use, and there has been sufficient rain to fill it, 127½ millions of gallons will be available. The average quantity distributed last year was 122 millions of gallons weekly, the maximum quantity delivered having been 132 millions, and that when the service was cut off for 17 out of the 24 hours. In this last-mentioned fact, we see evidence of the enormous waste

which must have taken place. The number of consumers in Liverpool increases at the rate of 3 per cent. per annum, and the waste has been found to increase in a much greater ratio. Thus it is made clear that the consumption has overtaken the supply, and that one of two things must be done—either the waste must be prevented, or the supply must be greatly enlarged. The former is, of course, the most easy, the cheapest, and, on sanitary grounds, the most to be preferred. The committee only ask Parliament for powers to make regulations such as have already been conferred upon several other corporations and companies with the most satisfactory results. If the powers sought by the Bill be obtained, the present water supply will be sufficient to last to the year 1881; but if owners and ratepayers do not consent to proceed with the Bill, the committee state very frankly that they cannot undertake the responsibility of giving the town and district an adequate supply of water even for one year longer, if there should be a dry season. This is putting the issue very clearly before the townspeople, who now have the option of deciding whether they will economize their present supply, or drive the Corporation to the expenditure of a very large sum to obtain water from another source. In the latter event, the water will not be available for a year or two, and the coming autumn may be a trying season in Liverpool.

This comparatively dry winter is already beginning to tell on catchment schemes. Leeds is very short of water, the reservoirs being at the present moment only half full. The Corporation of Leeds, we believe, have shrunk from incurring the odium that would for the moment be caused, by putting stringently in force the powers they possess for the prevention of waste, and the consequence is that the waste in Leeds, as in Liverpool, is very great. In the present emergency, the Corporation have given notice that they intend to cut off the night supply—that is to say, the water will be shut off from eight p.m. to six a.m. Of course, the notice has brought a storm of abuse on the Corporation. Every one in Leeds expects his house to be burnt down, or that his wife and children will be taken ill and all want warm baths in the night. There are also in Leeds continual complaints of a bad supply of water at the higher levels. Now, most probably, all this comes of waste from bad fittings, which might be rectified by a little firmness on the part of the Corporation in inspecting the houses and enforcing their regulations. Londoners, if they will take these things to heart, may perhaps come to the conclusion that the metropolis is, after all, not so badly supplied with water. Except in some small districts, the supply has never been short, and most certainly consumers are subjected to no vexatious regulations under our intermittent system.

As one consequence of the short supply in Leeds, the Corporation have been compelled to give notice that they will discontinue the supply of water in bulk to the Morley Local Board at the expiration of three months. What Morley will do for water we cannot imagine. The inhabitants never dreamt of such a contingency as this, and they have filled up their wells, and sold their pumps as old metal, we expect. They are going to try the effect of a deputation on the Water Committee of the Corporation of Leeds.

The Chester Water-Works Company are promoting a Bill to enable them to make a moderate addition to their capital, and to give them some very ordinary powers for the prevention of waste, &c. Of course they are opposed by the Corporation of Chester, who have just tried the experiment of a town's meeting, to obtain the consent of ratepayers and owners to the expenditure of municipal funds in parliamentary opposition. The meeting was very thinly attended, few being present but members of the Town Council and people interested in the water-works. In the end, it was found that from an informality, the proceedings must be commenced *de novo*. It seems that the notice convening the meeting was not affixed to the doors of some "Little Bethel" in the city. The citizens of Chester have, in consequence, some time for reflection, and we are certain that if they will consider impartially the purpose of the company, as revealed in the printed Bill, they will consent to no opposition to the measure. It is curious, but not surprising, to see that provisions contained in every Corporation Water Bill we remember are considered arbitrary and obnoxious in Chester, where the Corporation are extremely desirous to get possession of the water-works. If the company have, as alleged, expressed a willingness to part with the undertaking, objection may reasonably be made to any addition to the capital; but as regards the regulations, which are most strongly objected to, they are as necessary to the Corporation, if in possession of the works, as the company, and would probably be more stringently enforced by the Corporation. The citizens in general do not seem anxious for the transfer. The company, it is argued, pay only 4 per cent. on the ordinary shares, so the Corporation could not expect, under any circumstances, to make a profit.

The Derby Water-Works Company have given notice of their intention to increase the price of water supplied to the public bath, and as that useful institution is not appreciated, and in consequence is not profitable, the Town Council are angry with the company. But, even with the increased price, it seems that water is cheaper in Derby than in other Midland cities, for, said Mr. Alderman Barber,

> After raising the rate, it will still be below the price charged at Nottingham and Manchester, and he thought the company were entitled to the benefit of it being known that their prices were still below those of the city which had been held up as a public example. In Derby the present prices for water were for a supply not exceeding 10,000 gallons, 10d. per 1000 gallons. The price charged at Manchester for that quantity was more than double the amount charged here. For a supply exceeding 10,000 gallons, and below 20,000 gallons, the price at Derby was 9d. per 1000 gallons; while at Manchester it was 1s. 9d. For 50,000 gallons, and under 100,000 gallons, the price at Derby was 7½d. per 1000 gallons; at Manchester it was 1s. 8d. He had further details, but did not consider it necessary to proceed, and he had only mentioned these facts to show that at Manchester, where the water-works were managed by the corporation, they were at the present time charging double the amount it was proposed to charge at Derby.

The Corporation of Dublin do not seem to be in credit with neighbouring authorities. The Rathdrum Board of Guardians last week sent in a claim for arrears of rates due in respect of Corporation water-mains in the district; and, with the claim, a peremptory message to the effect that if the money were not paid on the very next day, the effects of the Corporation within the boundaries of the union would be seized in satisfaction of the amount. It seems that the Rathdrum Board have the reputation of keeping their word, so the city treasurer was sent off at once with the cash, and paid £328 under protest. Another union, Rathdown, have also sent in a claim for £251 for rates on the Corporation mains, but do not seem to be so urgent in their demand as Rathdrum. We must confess we are not sorry to see the Corporation of Dublin treated in much the same way as they have treated the gas company.

We are sorry to see two water companies quarrelling over a small district, and hope the Wrexham and Ruabon Companies will settle their differences without running each other to the expense of a parliamentary contest. It is not exactly fair to seek to take possession of another's district, unless there are very strong reasons for that course.

The A. B. C. Sewage Company are not getting on well at Southampton. They do not complete their works, and hence incur penalties. They now seek for an extension of time for the completion; and the Town Council of Southampton seem disposed to allow another twelvemonth if the company will deposit £1000 as caution-money. To this the company demur, and plead that the sum they have already paid to the Corporation entitles them to indulgence. The proposal actually made on behalf of the Native Guano Company was a curious one. It was that the company should complete the contract works, and carry on the A. B. C. process, within twelve months from the present time, the Corporation then to pay the company £500 per annum until the sum of £4750, paid by the company to the Corporation, shall be repaid, and the company to pay the said sum back to the Corporation out of the profits of the company until the Corporation shall receive back the full sum of £4750. We need hardly say that this proposal provoked laughter in the council. The Corporation stand out for the deposit of £1000, but agree to condone all the fines incurred by the company if the works are really proceeded with. They are now, it seems, practically abandoned. We are very much afraid that the shares in the Native Guano Company will never again sell for £40 each.

The state of the river Clyde is very much troubling the good people of Glasgow. No doubt it is very bad, and can only be remedied by a large expenditure of money for the diversion of the sewage, or for some treatment of the sewage before it reaches the river. The simplest form of treatment yet proposed, so far as we know, is that suggested by Mr. John Honeyman, in a paper on the "Drainage of Glasgow," read before the Architectural Society of Glasgow, and now published in the form of a pamphlet. The author, relying on the oxidizing power of fresh and flowing water, proposes to keep the sewers continually flushed. But where is the water to come from? Loch Katrine, as Mr. Bateman has told the Corporation of Glasgow, is not inexhaustible, and 10 millions of gallons per diem from that source cannot be devoted to the simple purpose of flushing sewers. But, says the author, water may be pumped from the Clyde for the purpose of rinsing out the larger sewers, while sufficient might be taken from Loch Katrine to flush the smaller sewers at higher levels. We must leave Glasgow people to decide on this matter. There is something, no doubt, in the author's notion of preventing putrefaction in the sewers, but we are afraid his scheme will not find acceptance. As regards the ventilation of sewers, the author has but little original to say. He has certainly devised an ingenious "trap," contrived to let out sewer gas, and so, as would appear, to be no trap at all. But, then, he intends the opening to be provided with a sort of shaft, in which a box of charcoal is to be placed, to disinfect the escaping gases. In the way de-

scribed, sewer gas would unquestionably be kept out of houses, but we confess that we see no particular recommendation in the device.

Glasgow is now being tempted to spend a large sum of money on a scheme which, while providing for the thorough drainage of the city, promises the utilization of the sewage by irrigation. It is proposed by Messrs. Bateman and Bazalgette to carry, by means which need not be mentioned here, the sewage to the coast of Ayrshire, but not to run at once into the sea.

They show in their plans land available for irrigation to the extent of 8000 acres lying north of Paisley and Johnstone, and land to the extent of 3000 acres between Irvine and Troon. This area they consider more than sufficient to ensure the continual and not merely temporary purification of the sewage, all risk of saturation and consequent nuisance being avoided. They anticipate, moreover, that in the course of some years, and with judicious management, an actual profit might be derived from the disposal of the sewage for purposes of irrigation. The cost of carrying out their plan is considerably less than it is placed at by opposing doctrinaires. Everything included, so far as the purchase of land and the construction of works is concerned, the estimated sum is £1,089,756. To this is added, for interest on money during construction of works, preliminary, parliamentary, law, and engineering expenses, 15 per cent., or £163,500—making the total outlay £1,253,256. The annual charge for this outlay would be, interest at 4 per cent., £50,130; annual cost of pumping, £3550; maintenance, £1320—total, £55,000, which is equivalent to a rate of about fourpence per pound on the present rental of the city. The system devised would be adequate, at the present rate of increase of population, to meet the wants of the city forty years hence.

We should be glad to see the scheme carried out, and only too happy to hear of an actual profit derived from the disposal of the sewage for the purposes of irrigation.

A few words must dispose of a work forwarded to us, entitled the "Sanitary Vade Mecum, which shows all the details of a plan "for the thorough surface cleansing of towns, and the converting "the refuse into composts for agricultural purposes, by Henry "Liddell, Hull." The writer is evidently an enthusiast, with a talent for organizing on paper. Some of his arrangements are very similar to those now adopted at Rochdale, as recently described in these pages, but we can hardly call them improvements. The author provides for the removal of all sorts of town refuge to a depôt, where it is emptied into a "compost tower," and allowed to rot and disintegrate, and so rendered fit for agricultural purposes. He is unfortunate in his supposition that rotting does not involve decomposition. We are afraid his compost towers would prove unmitigated nuisances, but no doubt the contents would be valuable manure. On the whole, we much prefer the simple plan followed in Rochdale.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

III.

Historical Introduction.

(Continued.)

Two years afterwards—*i.e.*, August, 1801—Lebon obtained a certificate of additions to the patent just referred to. In his description he enters with tolerable accuracy, considering the limited knowledge of chemistry at that period, into the products of combustion.

Here, for the first time, we meet with the word "thermolampe" (a stove to give light and heat); and, as it will subsequently appear, Lebon attached but little importance to be derived from gas as a means of lighting, the main substance of the patent being to obtain motive power by the explosion of inflammable gas when intermixed with atmospheric air. With the description is given a drawing of three cylinders, with their corresponding pistons, "similar to fire" (steam) "engines," explanatory of the method of operation. In the details he proposed to light the explosive compound by the electric spark, which was the subject of an important patent 50 years afterwards.

The specification is very lengthy, and proves the patentee to have possessed great intelligence. There creeps in, however, with his calculations of profit, the erroneous assertion, that the hydrogen of the gas would, during combustion, unite with the nitrogen of the atmosphere and so produce ammonia. He concludes by describing how the gas may be employed for lighting, and his description is as follows:—The combustion of the inflammable gas is effected in a glass globe supported on a tripod, and cemented in such a manner as to prevent the products of combustion escaping. He proposes three pipes—one of small dimensions to convey the gas into the globe, another for conveying air into the same, and a third to carry off the products of combustion. Provision is also made that the pipe for the air, as well as the pipe for the obnoxious products, may both be extended to the exterior of the apartment lighted, and he adds, that taps or valves may be placed on each of these pipes, in order to regulate the supply.

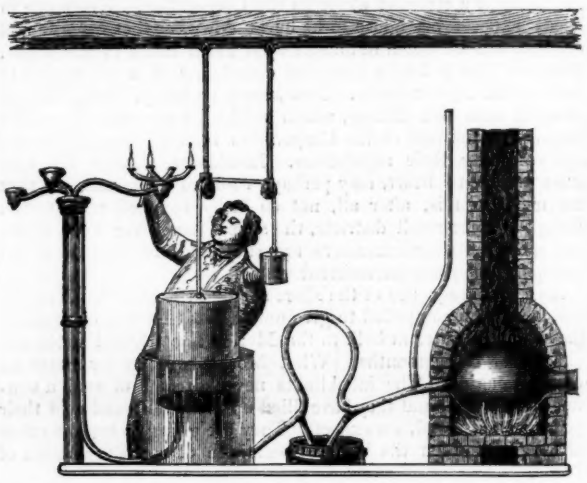
Although, about this period, there are some few contradictions amongst authors, as to dates, all agree that in the winter of 1802 Lebon for the first time exhibited lighting by gas at a house in Paris, and from Winsor's "Traité" we are led to conclude that this was carried into effect, according to the description in his certificate of additions just mentioned. The experiment created the greatest wonder and amazement amongst the thousands who witnessed it, and naturally called forth the praise of the local journals. From them the fame of the application or discovery was rapidly diffused by the continental press, and thus, accidentally, came under the notice of Winsor, who was destined to play a most prominent part in establishing the first gas company, and probably in accellerating the general use of gas for domestic purposes.

Winsor was then at Frankfort, whence he proceeded to Paris, and there witnessed several times "the wondrous effects of common smoke being made to burn with greater brilliancy and beauty than wax or oil." His first object was to become acquainted with the method of obtaining this light, but Lebon was by no means communicative, even by the "offer of 100 Louis d'or," his conditions simply being, that before he would disclose the secret of these "wondrous effects," a subscription should be raised for 200 of his stoves, amounting in value to about £10,000. There being no prospect of such conditions being realized, Winsor left Paris, as he said, "with the deepest regret at having failed in the object of his journey; however, firmly resolved, whatever trouble, time, and expense it might cost, to find out the causes of such important effects and results."

Perseverance and energy were qualities that Winsor possessed in a remarkable degree, and it is possible that he may have acquired the necessary knowledge from his own researches; but whether from this or other sources, he the following winter exhibited at Brunswick, in the presence of the reigning duke, Charles William Ferdinand, and all his court, a series of experiments on the products of the distillation of wood, and the means of lighting with gas obtained therefrom.

Having thus far met with success, no time was lost by Winsor in endeavouring to turn his "invention," as he termed it, to a profitable account. In one of his pamphlets he says, "the thought of introducing the discovery for the advantage of the British realm struck me like an electric shock;" and so, at the commencement of the year 1804, he appeared in London, and exhibited and lectured on "Gas-light," at the Lyceum Theatre.

The annexed drawing is copied from Parkes's "Chemical Catechism," published in 1810, and will give an idea of the most approved apparatus then in use. It was, doubtless, with such simple apparatus as this, that Winsor's lectures were illustrated.



There he described the various advantages to be derived from the new light, its freedom from sparks, so often the fruitful source of fires, the absence of smoke, and the intensity and steadiness of the flame. He also made experiments to prove the difficulty of the flame being extinguished by the wind, and numerous other points favourable to gas lighting. And here began the earliest troubles of his undertaking, for, being a German, and speaking English indifferently, he engaged an assistant to read his lectures. This man, at times, when the audience were in the theatre, absented himself with the manuscript of the lecture in his pocket, to the great disappointment of the public; but after a few good-natured words of apology from the principal sufferer, they dispersed. These events must have been very galling to him, as their relation forms a prominent feature in one of his many pamphlets.

In the month of May in the same year, Winsor obtained a patent for "An improved stove, oven, or apparatus for the purpose of extracting inflammable air, oil, pitch, tar, and acids from, and reducing into coke and charcoal, all kinds of fuel, which is also applicable to various other useful purposes."

Possessing this patent, his next step was to issue a pamphlet, in which his patent stoves were eulogised, but this publication was replete with the most extravagant absurdities respecting the "British Imperial Patent Stoves, Ovens, and Utensils for producing Sevenfold Heat and Beautiful Light, Oil, Pitch, Coke, and Pure Inflammable Gas, without Spark, Smoke, Soot, or Ashes, from which all the Accidents of Fire arise." In this pamphlet he states that, "Since the beginning of the world mankind has lost above 80 per cent. in all combustibles by the mere evaporation of smoke. This smoke, which often proves troublesome and dangerous to health and houses, is now discovered to contain the most valuable substances, and, if properly extracted, gathered, washed, purified, and resolved, we gain not less than five costly products—viz., oil, pitch, acid, coke, and gas." The extreme extravagance of the foregoing statement needs no comment. After showing a profit, from the application of the invention, of £64 10s.

for an outlay of £6 only, and asserting a number of chemical absurdities, he concludes by the following advertisement:—

"Such noblemen, gentlemen, public or private companies, or individuals, who, from witnessing the uncommon effects of common smoke, shall be convinced of the great utility of this discovery, and may have an inclination to embark some property in this valuable speculation, may be furnished with the sight of a written plan for a threefold grand national establishment." And here we come to the first introduction of the *National Light and Heat Company*.

Winsor, continuing his lectures, which there is every reason to believe were remunerative, began to agitate for the formation of a company, for the proper and full development of gas lighting. Extreme boldness was one of his characteristics, but his extravagant assertions, as to the enormous profits to be derived, created doubt and suspicion concerning the enterprise he advocated. He was very deficient in the knowledge of chemistry, of which deficiency he was not only unconscious, but he considered himself capable of discussing scientific matters with the most intelligent men of the day, at one time asserting that our atmosphere was "too strong a medicine," and at another, "that an admixture of coal gas made it more congenial to our lungs;" and that "gas could never inflame when mixed with air." These and a host of other absurdities, no doubt, greatly retarded his operations; but he was confident, enthusiastic, and energetic, and determined to achieve a success.

Following his first pamphlet above-referred to, appeared another, published in 1805, from which the following extracts are taken:—"I have made great improvements in my patent light-stoves, purified the gaslights from all scent, and increased their lustre. Persuaded of immense advantages, and encouraged by numerous friends, I beg leave to offer to you the enclosed plan for a profitable national company; and, with the patronage of you and your friends, a national concern will soon be raised to open a mine of wealth to Britain, anp add to the despair of our foes in their devices for our ruin. The £5 deposit will suffice for realizing the plans in London and its environs, and all further sums wanted will prove but a small reduction from speedy profits." In another circular he seriously asserted that a deposit of £5 would secure an annuity of £575.

One is almost induced to suppose that this enthusiast believed at the time in all he stated, for, judging from his writings during 12 years, his continued exaggerations lead only to the consideration that serious, sober reflection did not form part of his nature; he hastily came to a conclusion, and this, once formed, was not to be shaken. His productions of later years were more reasonable, still, however, bordering on the fabulous, as when asserting that the "National Light and Heat Company, was more solid than any other establishment whatever; it exceeds in benefits the water companies, by giving five valuable products from the destruction of a very great nuisance—that of smoke. These products amount to £20 in every chaldron of coal." "Being founded on a patent invention, it is certainly more secure than all our flourishing insurance, and even water companies."

Having briefly alluded to Winsor's first efforts in reference to the development of gas lighting, let us now consider the difficulties attending the task he had undertaken. Firstly, he was proposing a marvellous innovation—one without any precedent, of the most extraordinary magnitude, and requiring a proportionate capital for its realization. Unlike most other great changes, in which the progress is gradual—step by step—here the change from oil and tallow to that of gas lighting was proposed to be immediate, and this, without the public having been prepared by any previous practical application of the latter.

Moreover, the explosive nature of mixed gases had recently become known, and vague, yet powerful, apprehensions were cherished as to the danger likely to arise from their employment for the ordinary purposes of life. This was a powerful obstacle to the introduction of the new light. Added to this were the numerous interests of trade and commerce connected with the supply of oil and tallow, especially that of shipping, which has since been so signally benefited by the new art to which it was then supposed antagonistic. These and many other difficulties stood in the way of the innovation, which was said to be "wild, absurd, and extravagant in its conception, and fraught with the greatest danger in its execution;" and so preposterous appeared the project that "Winsor's gaseous proposals for enlightening the inhabitants of London," his "fire of wind" and "smoke lights," were popular subjects for ridicule and satire, as may be seen in some of the light literature of the day.

But such objections in no way disheartened Winsor, for, when they appeared in any newspaper, he replied through the same medium, substantiating his position and views; and when the columns of a journal were closed against him, he resorted to pamphlets, of which he produced several, and in spite of the gross absurdities abounding in his numerous communications, there is often so much good humour and wit in them, as favourably to impress the reader in his behalf.

But notwithstanding all the great disadvantages under which he laboured, and his extravagances and absurdities, yet by dint of his indomitable perseverance we find, towards the close of the year 1806, that Winsor was supported by a large and influential body of subscribers or shareholders, numbering amongst them members of the nobility, magistrates, bankers, merchants, &c. At that period, he occupied premises, adapted for offices and laboratory, in Pall Mall, on the site of the present Carlton Club, and here he continued his lectures and experiments, to which a charge for admission was made to the general public.

The first public street lighting with gas, which took place in Pall Mall, on the 28th of January, 1807—was an event that naturally dispelled many of the doubts existing as to its practicability; and in the month of June following, a commission of the subscribers was nominated to verify the official experiments in gas lighting. These were made on the 3rd and 4th of July, in the presence of the president, Mr. Grant, Baron Wolff, the Duke of Athol, Dr. Jenner, and others; and the results were so highly satisfactory that a meeting of the subscribers was held a few days afterwards.

On this occasion 26 members formed a committee of shareholders or subscribers, who, after expressing their gratification at the results of the official experiments, and considering that the enterprise presented such extraordinary advantages, alike for the nation and the people, unanimously resolved—"That £20,000 should be placed at the disposal of the committee, to enable Mr. Winsor to make his experiments on a greater scale, and, above all, to obtain their great object—a charter of incorporation of the company, which, by its resources, would render the discovery of the greatest advantage for the nation and Government."

At the same meeting other resolutions were passed, relating to the officers of the projected company, their finances, &c., and amongst these was the following:—"That the committee will hold their first regular meeting on Wednesday, the 12th (July), at Mr. Winsor's house, at two o'clock precisely;" and this may be considered the first official assemblage in connexion with the Chartered Gas Company.

(*To be continued.*)

Correspondence.

THE INFLUENCE OF DIFFERENCE OF LEVEL ON GAS PRESSURE AND ON THE REGISTRATION OF METERS.

SIR,—In your JOURNAL of July 1, 1873, a correspondent proposed the following problem:—

"A gas-meter fixed at the bottom of a hill is supplied with gas which is afterwards passed through a meter fixed on the top, the difference of level being 100 feet. The specific gravity of the gas is 470, and the temperature at which the gas is measured is the same in both meters. What will be the registration of the two meters?"

In your three following numbers appeared some practical remarks on the subject, but it is clear that the proposer of the question intended it as a problem to be solved by calculation, and as no solution has yet been given, I beg leave to offer one, particularly as the investigation involves some points of interest in regard to gas calculations generally.

There are three elements in the problem besides those stated, which, though of no great practical importance, enter theoretically into the calculation, and which, therefore, I will supply by assumption. These are, the height of the barometer at the lower level, which I will assume = 30 inches; the gas pressure at the same level, which I will assume = 1 inch of water; and the general temperature, which I will assume = 60° Fahr.

I will also assume that both meters are immediately upon the pipe, and that the pressure necessary to work them may be neglected.

As the temperatures are the same throughout, the only cause of difference in the registration will be that the difference in level will give rise to a variation in the elastic force of the gas, and this, according to the well-known law of gaseous fluids, will influence the volume. When the elasticity is greater the volume will be less, and *vice versâ*, the volume varying, according to Mariotte's law, in inverse proportion to the elasticity.

It is known in practice that for ordinary coal gas the pressure, as shown by a pressure-gauge, increases about 8-10ths per 100 feet rise in level; so that at the higher meter the pressure so shown will be nearly double what it is at the bottom. It might, for this reason, be supposed that under this apparent increase of pressure the volume would be reduced, and that the upper meter would register considerably less than the lower one.

This, however, is not so. The true answer is that the upper meter will register theoretically *more* than the lower one, but the excess will be so small as to be scarcely appreciable in practice. I will proceed to explain this apparent anomaly.

Mariotte's law, above mentioned, connecting the volumes and elasticities, refers, *not* to the pressure shown by the pressure-gauge (which is merely the excess of gas pressure above atmospheric pressure), but to the *absolute* intrinsic elastic force of the gas itself, without reference to the atmosphere at all. For this reason, in order to apply the law correctly, we must ascertain what are the absolute elasticities of the gas at the bottom and top of the pipe respectively. We will call the absolute elasticity at the bottom P, and at the top P_1, and we will express them in lbs. per square foot.

In the first place, the elasticity at the bottom P is, by our assumption, in excess of that of the atmosphere by 1 inch of water. The barometer at 30 inches gives the elasticity of the atmosphere = 2124 lbs. per square foot; and to this we have to add the equivalent of 1 inch of water, which is 5·21 lbs. per square foot.

Hence P = 2129·21 lbs. per square foot.

To find the absolute elasticity of the gas at the top of the pipe, we must carefully avoid all consideration of the external atmosphere at that place, and direct our attention only to the condition of the column of gas itself. The absolute elasticity at the bottom we have found as above, and as gas has gravity, like all other matter, it is clear that the absolute elasticity at the top will be *less* than this, by the weight of a column of the gas, 1 foot in area and 100 feet high.

To get this weight we must first find the weight of 100 cubic feet of air, at the same pressure and temperature, and then multiply it by 0·47, the specific gravity of the gas.

The following is a simple rule for finding the weight of air, omitting the effect of moisture, which is so small that it need not be considered here.

Let β be the height of the barometer in inches of mercury, and t the temperature Fahr.; then—

$$\left.\begin{matrix}\text{Weight in lbs. of}\\ \text{1 cubic foot of air}\end{matrix}\right\} = 1{\cdot}3264\,\frac{\beta}{460 + t}$$

Or if, instead of inches of mercury, we express the elasticity in lbs. per square foot (which call ϵ), we shall have—

$$\left.\begin{matrix}\text{Weight of}\\ \text{1 cubic foot}\end{matrix}\right\} = 0{\cdot}01873\,\frac{\epsilon}{460 + t}$$

Hence at a mean elasticity of say 2125 lbs., and temperature 60°, we find that 100 cubic feet of air would weigh 7·65 lbs. Multiplying this by 0·47, the weight of the 100-foot column of gas will be about 3·6 lbs.

Hence the absolute elasticity of the gas at the upper level will be—

$$2129{\cdot}21 - 3{\cdot}6 = 2125{\cdot}61 \text{ lbs. per square foot.}$$

[It may naturally be asked, how is this reconcileable with the known fact of the increase shown by the pressure-gauge at higher levels? Simply by the fact that the pressure so shown is only the *difference* between the elasticity of the gas and the elasticity of the atmosphere; and that, although the absolute elasticity of the gas is reduced at 100 feet high, yet at this elevation the elasticity of the atmosphere is so much *more* reduced, that the difference is greater at the high than at the low level. This will be further illustrated by-and-by.]

We can now correctly apply Mariotte's law. By inverse proportion, as the elasticity at the top, 2125·61, is to that at the bottom, 2129·21, *so is* any volume of gas at the bottom, say 1000 cubic feet, to the volume it will assume at the top = 1001·7 cubic feet. Hence, for the same weight of gas passing, the upper meter will register it at one-seventh per cent. more than the lower, which is the answer to the problem given.

It may be interesting to make a slight addition to the problem—namely, to inquire what the gas will measure when it escapes, at the high level, into the air. It will then take the same pressure as that of the high-level atmosphere, and in so doing will expand in volume.

To determine the amount of this expansion, we must find (what we have hitherto neglected) the pressure of the air at the high level. This will be determined by the same method adopted for the gas—namely, by deducting from the pressure at the lower level (2124 lbs. per square foot) the weight of a column of air 1 foot square and 100 feet high, which, at barometer = 30 and thermometer 60°, will be 7·6 lbs. Hence the pressure of the atmosphere at the higher level will be 2124 − 7·6 = 2116·4 lbs. per square foot.

As, then, the gas, in escaping, will take this pressure, it will, by Mariotte's law, expand in volume accordingly, and the 1001·7 cubic feet, measured while at the top of the pipe, will become 1006 cubic feet as it passes through the holes of the burners.

It will now be seen that the excess of pressure of the gas over the air at the top of the pipe (or, in other words, the "gas pressure," shown by a pressure-gauge) will be 9·21 lbs. per square foot, = 1·77 inches of water; and as the pressure at the bottom is 1 inch, this shows an increase, for the 100 feet rise, of 0·77 inches, which corresponds nearly enough with the ordinary practical rule.

The following table will put in a clear form the foregoing results:—

Difference in Pressure for 100 *feet Difference of Level.*
Specific Gravity of Gas 0·47.

	Absolute Pressures in lbs. per Square Foot.		Difference, or "Gas Pressure."	
	Gas.	Atmosphere.	Pounds per Square Inch.	Inches of Water.
At high level . . .	2125·61	2116·4	9·21	1·77
At low level . . .	2129·21	2124·0	5·21	1·00

In conclusion, it will be worth while to give a *résumé* of the rules regarding the pressures in a general algebraical form, as applicable to other pressures, temperatures, and specific gravities. Let—

H = Difference of level of the two stations in feet.
P = Absolute pressure of gas at the lower level.
P_1 = Absolute pressure at higher level.
p = Atmospheric pressure at lower level.
p_1 = Atmospheric pressure at higher level.
(All these pressures being in lbs. per square foot.)
s = Specific gravity of gas (that of air at same pressure and temperature being = 1).

Then we shall have the following relations:—

$$\frac{p_1}{p} = 1 - \frac{0{\cdot}01873\ \mathrm{H}}{460 + t}$$

$$\frac{\mathrm{P}_1}{\mathrm{P}} = 1 - \frac{0{\cdot}01873\ \mathrm{H}s}{460 + t}$$

Or, to find directly the difference of "gas pressure" (as shown by the pressure-gauge) due to any height—

Let x = this difference, shown in inches of water.

And let β = height of the barometer in inches of mercury.

Then, after making the necessary reductions and effecting some simplifications—

$$x = \frac{0{\cdot}2546\ \mathrm{H}\beta}{460 + t}\,(1 - s)$$

To test the application of this formula, I may cite some experiments made by an engineer of eminence. He erected a tube 100 feet high, and fixed King's pressure-gauges at the top and the bottom. He then filled the tube with gases of different densities, and noted the result on the gauges. The barometer was very nearly 30 inches, and the thermometer nearly 60° during the whole series.

When filled with ordinary coal gas, whose specific gravity was estimated at 0·45, the gauge at the bottom showed 1 inch; that at the top, 1·83; difference, 0·83. The formula gives 0·81.

The tube was next filled with hydrogen gas, and the difference of the gauge rose to 1·20. Working out the formula for pure hydrogen (s = 0·069), the difference should be = 1·35; so that probably the gas was not perfectly pure.

Finally, carbonic acid gas was used. The gauge at the bottom of the tube showed 1 inch, that at the top 0·33, giving a *minus* difference of 0·66.

Taking the specific gravity of pure carbonic acid gas at 1·529, the difference by the formula should be = − 0·78; so that it is probable this gas was slightly mixed with either carbonic oxide or atmospheric air.

At any rate the correspondence is sufficient to prove the general applicability of the formula.

By a slight modification the same principle may be made useful for what I believe is a new application, that is, as a means of *ascertaining the specific gravity* of coal gas.

Let a vertical tube of as great height as can be obtained be fitted with accurate and sensitive pressure-gauges at the top and bottom, and filled with the gas to be tested. Note the temperature (which should be perfectly uniform for the gas and the air) and the height of the barometer at the bottom of the tube. Let—

d = Difference of gauges in inches of water.
β = Barometer in inches.
t = Temperature Fahr.
H = Difference of level in feet of the two gauges.
s = Specific gravity of the gas.

Then—

$$s = 1 - \frac{3{\cdot}93\ d\ (460 + t)}{\mathrm{H}\beta}$$

From which the specific gravity can easily be found.

Westminster, Feb., 1874. W. P.

GAS-FITTINGS ON HIRE.

Sir,—About six years since I induced my directors to adopt the system of letting out fittings on hire, as a means of introducing the use of gas in the houses of mechanics and others, who could not otherwise be induced to become consumers. Thinking the result may be a useful guide to other companies, where the district includes much cottage property let to weekly tenants, I send you the following data of the system, after six years' working. We now have 120 consumers who hire fittings, and these produced a gross rental of £279 7s. for last year, or an average of £2 6s. 6d. each. This is made up of the following charges:—Meter rent, 4s.; fittings rent, 5s.; and 8300 feet of gas at 4s. 6d., making £1 17s. 6d. These 120 new consumers contribute about £70 to the profit of the year, with dear coal, or one-half per cent. towards our dividend for the year. Some companies have tried the plan of letting out fittings, but have found it unremunerative. I think this must have arisen from using a too costly kind of fitting, on which the deterioration in value would be relatively too great. We use a neat pattern stuffing-box pendant with two burners, a plain single light similar pendant, ordinary swing pendants, and plain brackets. Chandeliers of expensive patterns we decline to provide at all on hire. The selling price for two pendants in two rooms, including pipes, taps, labour, &c., we make 30s., or 9d. per quarter for hire. If the consumer at any time chooses to purchase his fittings, we deduct one-half of the hire which has been paid from the original selling price. We have found the adoption of this system advantageous, because the great objection to the use of gas by the tenants of small houses was always that of the first cost of providing fittings, and the risk of loss in case of removal to another house. This objection is now entirely met, and I believe if it were not for the facilities we give, not ten of the 120 consumers we provide with fittings, would burn gas. We find, at 4s. 6d. per 1000 feet, the average cost of one light is from ¾d. to 1d. per night the year through. I need scarcely mention we have a written consent from the owner of the property that we may put up and remove the fittings, but no sensible landlord objects to give this consent. In ordinary cases the fittings are put in complete, with no other charge to the tenant than the bare rent, which is usually 6d. per quarter for the first burner, and 3d. each for every additional one after the first. I write off 5 per cent. per annum for deterioration, and this I find is ample. I shall be glad if any secretaries or managers who have adoped the system can give any hints for its further improvement.

Sheerness, Feb. 21, 1874. A. W. Marks, Secretary.

TAR AS FUEL.

Sir,—In Mr. Anderson's communication in your issue of Jan. 20, referring to the use of "Tar as Fuel," he says: "I use from 70 to 90 gallons per 24 hours to heat six or nine retorts." If he had told us how much coal he carbonized with that amount of tar, we should be in a better position to judge of the value of his arrangements for using it. With an arrangement we have tried, we have used from 100 to 120 gallons per 24 hours to heat five retorts, in which we carbonized 6000 lbs. of coal.

We, on this side the "herring-pond," are certainly deeply indebted to Mr. A. for instructing us "how to use tar as fuel," but we are sorry that we have to disagree with him in his opinion that it is "absurd" and "barbarous" to use tar and coke in the same furnace. Over 20 years ago we did this, where there was no market for our tar, and the fact that we could keep up our heats, and that without *smoke*, was sufficient proof to us that it is neither "absurd" nor "barbarous." We saw the same thing done in Scotland 35 years ago, and, although we know that the folks "frae ayout the Tweed" were at one time considered somewhat "barbarous" in their habits, we also know that even farther back than the period referred to, they were, and are still, held in no mean estimation on *both* sides of the Tweed as managers of gas-works.

Milwaukie, Wis., U.S.A., Feb. 6, 1874. Jas. H. Walker.

Honour to Mr. R. H. Jones.—The Lord Chancellor has been pleased to appoint Mr. Robert Hesketh Jones (of the firm of Anderson and Jones), as one of Her Majesty's Justices of the Peace for the borough of Dover.

Barnet Gas and Water Company.—The report of the proceedings at the half-yearly meeting, on Friday last, is unavoidably postponed, for want of space, until our next number.

Cardiff Gas Company.—The seventy-fourth half-yearly meeting of the proprietors in this company was held on the 24th ult.—Mr. Wm. Bird in the chair. The report stated that, owing to the continued high price of coal, the profit for the last half year was insufficient to pay the usual dividend, and the directors proposed to make up the deficiency from the reserve-fund. The usual dividend was declared, payable on the 25th inst. The retiring directors and auditor were re-elected. The thanks of the meeting were voted to Mr. Bowen, the engineer and manager, and also to the chairman and directors, for their attention to the interests of the company.

Miscellaneous News.

RATCLIFF GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of Shareholders was held at the Offices, Cable Street, on Friday, the 27th ult.—J. E. Bromley, Esq., in the chair.

The Secretary (Mr. H. J. Baddeley) read the notice convening the meeting, and, the seal of the company having been affixed to the register of shareholders, read the following report and statement of account:—

The directors have the pleasure of submitting their report and accounts for the half year ending Dec. 31, 1873.

The works and plant during the past six months have been efficiently maintained.

The accounts, which have been duly audited, show a net profit of £4220 4s. 3d. Out of the available balance of profits, the directors recommend that a dividend upon the paid-up capital of the company, after the rate of £5 per cent. for the half year ending Dec. 31, 1873 (less income-tax), be now declared payable on and after the 4th day of April next.

The retiring directors, Henry Baddeley, Thomas Morrison Fairclough, and Henry Lawrence Hammack, Esqs., and the retiring auditor, John Sander, Esq., being eligible, offer themselves for re-election.

Trade Account, for the Six Months ended Dec. 31, 1873.

Dr.				*Cr.*		
Coals	£13,440	6	9	Gas	£15,826	19	3
Purifying materials	110	14	2	Public lighting	1,894	8	6
Salaries of engineer and clerk at works	385	0	0	Rental of meters	125	4	0
Wages	2,011	12	5	Coke	6,104	13	0
Repairs and maintenance of works and plant, and labour . . £2,701 6 7				Breeze	117	10	9
Less old material sold 30 4 11				Tar	1,056	16	0
	2,671	1	8	Liquor	871	6	10
Salaries of inspectors and clerks in office	357	3	0	Rents	82	6	1
Repairs and maintenance, distribution, and labour	397	16	9	Miscellaneous receipts	327	7	9
Repairing and renewing meters	258	6	0				
Lighting and repairing public lamps	331	15	10				
Rents	180	5	2				
Rates and taxes	417	8	2				
Directors allowances	400	0	0				
Salaries of secretary, accountant, &c.	386	12	6				
Collector's commission	133	4	0				
Stationery and printing	40	8	0				
General establishment charges	109	13	0				
Auditors	15	15	0				
Depreciation-fund (leaseholds)	110	0	0				
Bad debts	37	10	6				
Interests on borrowed capital	391	15	0				
Net profit	4,220	4	3				
	£26,406	12	2		£26,406	12	2

The Chairman, in moving the adoption of the report, said he believed the position of affairs which was presented by the report and accounts must be as satisfactory to the shareholders as it was to the board. He thought it probable that it was owing to this circumstance that the attendance at the meeting was so small. As he had no statements to make in addition, he would at once move the adoption of the report.

Mr. H. Baddeley seconded the motion.

Mr. Jones said he saw that the largest company in London was now before a commission appointed by the Board of Trade, asking authority to increase the price of gas from 3s. 9d. to 4s. 10d., in order to make up their statutory dividend for the current year. He should like the chairman to explain, if he could, the reason for that application, seeing that the Ratcliff—the smallest company in London—while charging 3s. 9d. per 1000 only, for gas which, tested by the same burner, would be of equal quality, were in a position to pay their shareholders 10 per cent. on the present occasion.

Mr. H. Baddeley: Management.

The Chairman said it did seem an extraordinary circumstance, but this company never put themselves in comparison with others. No doubt there was much in what Mr. Baddeley said—"management"—and, seeing the results which this company had attained, he thought they might well take credit for good management.

Mr. Wilkinson asked if the profits of the last half year would pay the 10 per cent. dividend.

The Chairman said not quite. The profits were £4220, and it required £5000 for the dividend. They would have to dip into the reserve-fund for the small difference.

Mr. Hammack said the directors were desirous to see what sailing close to the wind would do, in the interests of the shareholders; and, under the careful supervision of the works and business, by their engineer and secretary, they had been able to succeed.

Mr. Jones said the accounts of the company were second to none in the kingdom. It was said, before the day of trial to which all gas companies had been exposed, that, in the event of coal going up in price, the enhanced value of coke would always recoup the additional cost. But those statements, made on the authority of witnesses before parliamentary committees, had been falsified. Previous to the great rise in coal, the difference between the average selling price of coke and coal in this company was about 5s., whereas the difference during the last year was more than 8s., and at the present time it was something like 13s. The evidence given before Mr. Cardwell's committee ended in the absurd legislation of fixing a low maximum price for a manufactured article, when the cost of the raw material and the labour necessary to produce it could not be controlled. This was now being investigated, and its impolicy laid bare. He quite endorsed the remarks of the chairman, that to the great care and good management displayed in this company the fortunate results now enjoyed were due.

The motion was put, and carried unanimously.

On the motion of the Chairman, seconded by Mr. Fairclough, the dividend recommended in the report was declared, and the retiring directors and auditor were re-elected.

The Chairman, in acknowledging a cordial vote of thanks to himself and co-directors, said the members of the board had been long in harness, they gave great attention to their duties, and, he thought, knew their business pretty well; but he might add that, without the able assistance of their officers, they would, after all, cut but a poor figure.

A vote of thanks having been passed to the secretary and engineer,

The Secretary acknowledged the same. He said for 15 years it had been his good fortune to receive the thanks of the shareholders at their meetings. In past years the officers of the company had had precedents to work on, and every one knew the value of precedents in such matters. But of late gas companies had had neither beacons nor buoys by which to steer their course, and it was, therefore, matter for congratulation when they were able to reach a safe haven. He could only say, for his colleague (Mr. Jones) and himself, that under the able management of the directors they had striven hard to maintain the interests of the shareholders. It was a source of great satisfaction that the most complete harmony prevailed in every department of the company's service, and he felt confidence that so long as this sentiment was cherished the welfare of the shareholders would be carefully promoted.

SOUTH SHIELDS GAS COMPANY.

The Annual General Meeting was held on Friday—Mr. Wallis in the chair.

The Secretary (Mr. J. W. Lawson) read the following report:—

The directors have much pleasure in presenting the shareholders the annual report of the company, along with the balance-sheet and accounts for the past half year, ending the 31st of December. The company have had many difficulties to contend with during the past year, from the continued high price of coals and labour. From the large number of new consumer the producing power of the works has been taxed to the utmost, but your directors are happy to state they have been able to meet all demands upon the company to the satisfaction of the public. The increased make of gas during the year has been nine millions cubic feet. The illuminating power has been kept up to the standard required by Act of Parliament. Further extension of the works being absolutely necessary before next winter, your directors have now before them plans for utilising the site of the old Jarrow works (at the cost of at least £10,000), which they hope will prevent the company going to Parliament to seek extension of power for some years to come. From the large increase of consumption, and the ready sale of the residual products, your directors recommend the usual dividend of 4½ per cent. on the old, and 3½ per cent. on the new stock of the company, for the half year, which may be made payable on the 7th day of March.

The Chairman, in moving the adoption of the report, said this was the jubilee of the company—the 50th year of its establishment—and there were few companies which had enjoyed greater prosperity than the South Shields Gas Company, with the exception of one or two years, when they were undergoing a transition, as it were. They had had most unanimous meetings, and had been able to declare their maximum dividend. He might remark that they had a gentleman on the board of directors—Mr. W. Anderson—who was one of the provisional committee in the formation of the company, and since that time he had taken the greatest possible interest in their affairs. During the year Dr. Armstrong, who was a director, had removed from the district, and his place on the board had been filled by the election of Mr. Henry Nelson. From the annual statement, it would be seen that they had had a most successful year, and had a large surplus, although in point of fact they were not in quite so good a position, in regard to the year's work, as the figures would show. The company had been most fortunate in making coal contracts. In 1872 they were able to carry on with the contracts made for coal during the previous year. In 1873 they had to make fresh contracts. This year they had also made their contracts, although, of course, not on such favourable terms as on the previous years, having to pay an increased price from 13s. to 17s. 6d.; but altogether they had been fortunate. There was every prospect of the coal market coming down, and as this might affect the price of the products sold he would suggest that instead of the surplus being carried on to the reserve-fund, they should pass it on to account. During the past year they had experienced great anxiety in order to keep up the requirements of the public, owing to the greatly increased demand for gas, and in the presence of this increased demand it was absolutely necessary to have some extension of the works. This question of the extension had been under the consideration of the directors for the past two years, and they had at length come to the determination to adopt some plans prepared by their engineer for the extension of the Jarrow works, which, it was thought, would carry them over five or six years to come. It was most desirable that this extension should be made, the cost of which would be something like £10,000. The business of the company was rapidly entending, and the increase of the make was very large. It was put down as nine million cubic feet, but for the last five years it had averaged ten millions.

Mr. J. Ridley seconded the adoption of the report, which was put and carried unanimously, and the usual dividend of 4½ per cent. on the old, and 3½ per cent. on the new capital, for the half year ending at Christmas last, was declared.

Mr. Dale suggested that as Mr. W. Anderson had been connected with the company for the long period of 50 years, some mark of approval should be made on the minutes in recognition of Mr. Anderson's services. He also suggested that a piece of plate, of the value of 50 guineas, be presented to Mr. Anderson as a mark of esteem from the shareholders of the company.

Mr. J. L. Hall, Mr. Oliver, and other gentlemen, spoke of the abilities of Mr. Anderson and his efforts for the success of the company.

Mr. Anderson acknowledged the compliment which was paid him.

The Mayor moved a vote of thanks to the directors for their services during the past year.

Mr. Douglass seconded the motion, which was put and carried.

Mr. Henderson returned thanks on behalf of the directors, and said that they were ably assisted by Mr. J. Warner, the engineer, and Mr. J. W. Lawson, the secretary.

Mr. Anderson proposed a vote of thanks to the chairman for presiding.

Mr. Nelson seconded the proposition, which was carried unanimously.

The Chairman, in acknowledging the vote, said since the last meeting there had been an extension of the mains to Harton. From a return prepared by the engineer (Mr. Warner) he was able to inform them of the position of the company at the present time as compared with what it was in 1856. In 1856 the capital of the company was about £18,000; the gross profit about £1400; and the make about 34 millions of cubic feet, but at the close of 1873 the make was about 112 million cubic feet, and the capital was about £50,000.

The directors were re-elected for the ensuing year, as well as Mr. Ridley, the auditor, and the proceedings terminated.

IMPERIAL GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly Meeting of the Proprietors of this Company was held at the Offices, John Street, Bedford Row, on Thursday, Feb. 26—Edward Vaughan Richards, Esq., Q.C., the governor, in the chair.

Mr. B. F. Davies (in the absence of the secretary, who was in attendance on the Revision Commissioners) read the notice convening the meeting, and the governor then affixed the seal to the register of shareholders.

The following report and statements of account were submitted:—

Your directors regret to report, with reference to the transactions of the past half year, that the price they have been able to obtain for coke has proved not to be by any means commensurate with the large additional cost incurred for coal under contracts entered into in the beginning of last year.

In addition to the loss caused by the relative prices of coal and coke, considerable expense has been incurred in the endeavour to adopt a system of purifying with lime, for the purpose of satisfying the orders of the gas referees, who require a diminution of sulphur compounds in the company's gas, without regard to the cost at which such a result can be obtained. All the other items of receipt and expenditure during the past six months bear a fair comparison with those of previous years, but the unprecedented state of the coal trade has certainly entailed an additional net cost to this company, upon that material alone, of not less than £54,000 during the past half year, and it is more than probable than the accounts for the current year will, from the same cause, be still more prejudicially affected.

The accompanying statements of accounts show that the net profit of the past six months, after deducting interest due on borrowed capital, amounts to £69,162 15s. 5d., whilst the sum of £110,809 10s. 2d. is required to pay the statutory dividends.

It is necessary, therefore, to draw £41,646 14s. 9d. from the reserve-fund in order to make up the deficiency. The balance remaining at the credit of this fund will thereby be reduced to £27,065 6s.

Under these circumstances your directors have been compelled to appeal to the Board of Trade, under the provisions of the company's Act of 1869, for a revision of the price of their gas for the current year; for which purpose three commissioners have been appointed, whose decision may be expected early in March.

The price which may be sanctioned by the commissioners will be chargeable from the 1st of January last.

Towards the end of last year it was found to be absolutely necessary to commence the manufacture of gas at the company's new works at Bromley. Those works were accordingly put in operation on the 16th of December, and gas has since been supplied from thence in aid of the other works of the company. It is most satisfactory to add that the whole of this very large manufactory, with its plant and apparatus, proved to be thoroughly efficient.

IMPERIAL GASLIGHT AND COKE COMPANY.

Statements of Account for the Half Year ending Dec. 31, 1873.

No. 1.—STATEMENT OF STOCK AND SHARE CAPITAL, *on Dec.* 31, 1873.

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Maximum Dividend authorized.	No. of Shares issued.	Nominal Amount of Share.	Called up per Share.	Total paid up.	Amount issued but not paid.	Remaining to be issued and called up.	Total Amount authorized.
17 Vict., cap. 55.	Stock.	10 per cent.	..	..	..	£1,560,000 0	..	..	£1,560,000
29 & 30 Vict., cap. 352.	Share.	7 Ditto.	78,000	£12 10 0	£12 10 0	975,000 0	..	..	975,000
32 & 33 Vict., cap. 128.			24,133	12 10 0	5 0 0	120,665 0	..	£204,335	325,000
						£2,655,665 0	..	£204,335	£2,860,000

No. 2.—STATEMENT OF LOAN CAPITAL, *on Dec.* 31, 1873.

Acts of Parliament authorizing the Loan Capital.	Description of Loan.	Rate per Cent. of Interest.	Total Amount borrowed, Dec. 31, 1873.	Remaining to be borrowed.	Total Amount authorized.
17 Vict., cap. 55.	Bonds for profits capitalized	10 per cent.	£130,000	..	£130,000
	Debentures	4 to 5 ditto.	43,000	..	43,000
29 & 30 Vict., cap. 352. 32 & 33 Vict., cap. 128.	Ditto	Ditto.	243,750	£81,250	325,000
			£416,750	£81,250	£498,000

No. 3.—CAPITAL ACCOUNT.

To Expenditure, to June 30, 1873			£2,598,904 19 5
Since that date—			
Land	£5,277 18 10		
New buildings & machinery in extension of works	152,798 0 0		
New and additional mains, services, and meters	7,923 1 8		
		165,999 0 6	
Total expenditure			£2,764,903 19 11
Balance			307,511 0 1
			£3,072,415 0 0

	Certified Receipts to June 30, 1873.	Received since that date.	Total Receipts to Dec. 31, 1873.
By Consolidated Stock (1871)	£1,560,000 0 0	..	£1,560,000 0 0
Ditto £12 10s. Shares (1866)	325,000 0 0	..	325,000 0 0
Ditto £12 10s. ditto (1870)	324,785 0 0	£215 0 0	325,000 0 0
Ditto £12 10s. ditto (1872)	194,962 10 0	130,037 10 0	325,000 0 0
Ditto £12 10s. ditto (1873)	..	120,665 0 0	120,665 0 0
	£2,404,747 10 0	£250,917 10 0	£2,655,665 0 0
Bonds for capitalized profit	130,000 0 0	..	130,000 0 0
Debentures	205,150 0 0	81,600 0 0	286,750 0 0
	£2,739,897 10 0	£332,517 10 0	£3,072,415 0 0

No. 4.—REVENUE ACCOUNT.

To Manufacture of gas—			
Coals, including dues, carriage, unloading, &c.	£273,875 8 7		
Purifying materials, oil, and sundries	11,160 13 3		
Salaries of engineers and officers at works	2,494 0 0		
Wages (manufactory)	33,321 6 5		
Repairs and maintenance of works and plant, machinery, apparatus and tools, materials and labour—less £1228 3s. 9d., received for old materials	40,203 17 11		
		£361,055 6 2	
Distribution—			
Salaries and wages of officers connected with distribution	6,981 14 8		
Repairs, maintenance, and renewals of mains and services, including materials, paving, and labour	4,819 4 10		
Meters—repairs and renewals	5,592 3 4		
		17,393 2 10	
Public lamps—			
Lighting and repairing		7,161 11 10	
Rents, rates, and taxes—			
Rents payable	1,717 12 7		
Rates and taxes	6,894 13 2		
		8,612 5 9	
Management—			
Directors allowance	2,000 0 0		
Company's auditors	105 0 0		
Salaries of secretary, accountant, and clerks	3,303 3 6		
Collectors commission	4,885 6 11		
Stationery and printing	1,531 14 7		
General charges and incidentals	2,261 4 9		
		14,086 9 9	
Law charges		185 16 2	
Bad debts		1,847 9 10	
Gas referees and official auditor	527 18 9		
Public testing-offices	58 1 8		
		586 0 5	
Total expenditure		410,928 2 9	
Balance, carried to profit and loss account (No. 5)		80,726 1 4	
		£491,654 4 1	

By Sale of gas—		
Per meter (1,628,533,000 cubic feet), at 3s. 9d. per 1000	£305,336 10 4	
Public lighting and under contracts	39,678 18 4	
		£345,015 8 8
Meter-rental		7,980 12 9
Residual products—		
Coke, less charges	114,993 12 7	
Breeze, ditto	188 8 2	
Tar	13,409 4 11	
Ammoniacal liquor	9,188 7 3	
		137,779 12 11
Rents receivable		825 14 9
Transfer fees		52 15 0
		£491,654 4 1

No. 5.—PROFIT AND LOSS ACCOUNT (NET REVENUE).

To Interest on bonds and debentures, to Dec. 31, 1873		£12,184 5 10
Ditto on temporary loans, &c.		190 12 4
Balance		69,162 15 5
		£81,537 13 7

By Balance from last account		£99,356 10 0
Amount drawn from reserve-fund		7,829 19 0
		107,186 9 0
Less dividend for the half year ending June 30, 1873		107,186 9 0
Amount from Revenue Account (No. 4)		80,726 1 4
Interest on calls in arrear		12 16 4
Dividend on contingency-fund, invested in Consols		798 15 11
		£81,537 13 7

No. 6.—RESERVED FUND.

To Profit and Loss Account to make up deficiency for dividend in previous half year		£7,829 19 0
Balance		68,712 0 9
		£76,541 19 9

By Balance from last account		£75,425 13 8
Dividend on Consols		1,116 6 1
		£76,541 19 9

No. 7.—CONTINGENCY-FUND.

To Balance		£50,000 0 0

By Balance from last account		£50,000 0

No. 8.—STATEMENT OF COALS.

Description of Coal.	In Store, July 1, 1873.	Received during Half Year.	Carbonized or used during Half Year.	In Store, Dec. 31, 1873.
	Tons.	Tons.	Tons.	Tons.
Newcastle	48,428	188,292	203,164	33,556
Cannel	3,945	10,090	9,413	4,622
	52,373	198,382	212,577	38,178

No. 9.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In Store, July 1, 1873. Estimated.	Made during Half Year. Estimated.	Used in Manufacture during Half Year. Estimated.	Sold during Half Year.	In Store, Dec. 31, 1873. Estimated.
Coke—chaldrons of 36 bushels	1,285	212,585	58,973	122,784	32,113
Breeze—ditto	349	27,431	..	25,607	2,173
Tar—Gallons	48,724	1,844,833	..	1,662,059	231,498
Ammoniacal liquor—butts of 108 gallons	450	44,897	..	41,552	3,795

No. 10.—BALANCE-SHEET.

To Capital, for balance per account (No. 3)	£307,511	0	1	By amount invested in Three per Cent. Consols—		
Reserved fund, for amount of account (No. 6)	68,712	0	9	Reserved fund	£67,595	14 8
Contingency-fund, ditto (No. 7)	50,000	0	0	Contingency-fund	50,000	0 0
Interest due to Dec. 31, 1873, on bonds and debentures	11,846	12	5	Cash at bankers and on deposit	67,784	5 0
Sundry tradesmen and others, for amount due for coals, stores, &c., to Dec. 31, 1873	68,963	13	2	Gas and meter rental, for amount due to company, to Dec. 31, 1873	248,844	9 7
Profit and loss, for balance of account (No. 5)	69,162	15	5	Coke and other residuals, ditto	9,857	12 1
				Sundry accounts, ditto	12,762	13 5
				Coals, for stock on hand	53,782	0 4
				Coke and breeze, ditto	22,949	14 11
				Tar and ammoniacal liquor, ditto	2,537	17 7
				Sundry stores, ditto	40,081	14 3
	£576,196	1	10		£576,196	1 10

We have examined the above accounts, and certify them to be correct. { W. Hawes, Robert Mansel. } *Auditors.*

I hereby certify that the above accounts are correct, and that there are no losses or forfeitures to be deducted.
Chas. H. Parkes, *Official Auditor.*

The Governor: Gentlemen, those amongst you who were present at either of the two last half-yearly general meetings will well recollect how I warned you that day by day our balance of profit and loss applicable to dividend was becoming more and more dependent upon the price which we obtained for our coke. Indeed, it is self-evident that, with a fixed price for gas, the only source to which we can look for compensation against the high price of coal is in the value of the residual products of our manufacture. Now, at the commencement of the half year under review, and for a very few weeks, the price of coke ruled extremely high; and I confess that for myself I was almost seduced into the expectation that we might find throughout the six months something like compensation in this direction for the extremely high price we were paying for coal. But any solution of that kind to our difficulties was speedily dispelled as the half year rolled on, for while we were paying as much as 26s. and 28s. per ton for our coals, we could only obtain 12s. per chaldron for our coke. The result you have in the accounts before you, which show that we are unable to pay our parliamentary dividends by no less a sum than £41,646. It is under those circumstances that we were compelled, though very reluctantly, to have recourse to that section of the Imperial Gas Act, 1869, which enables us to apply to the Board of Trade for a revision of the price of gas for the current year. As soon, therefore, as the turn of the year came, we immediately gave the necessary notice to the Board of Trade, asking them to appoint arbitrators or commissioners for that purpose. The board at once appointed three gentlemen, each of position in their several departments, and they happen to be, I am glad to say, the same three gentlemen to whom was entrusted the revision of the price of the Chartered Gas Company last year. We have, therefore, the satisfaction of knowing that not only are these gentlemen of high position in their several professions, but that they are able to bring to bear upon this inquiry the experience which they have acquired in a similar investigation. On Thursday last they sat for the first time, and they continued their sittings on the two following days. On Saturday they adjourned to this day, and at this very hour they are about to resume their labours. The case, of course, was opened by the Imperial Company, who may be said to represent the plaintiffs; while the Metropolitan Board of Works, as representing the general body of consumers, appear, and very properly so—they could not do otherwise, with a due regard to their duty—as our opponents. We called before the commissioners Mr. Field, our accountant; Mr. Kirkham, our engineer; Mr. Chubb, our secretary; and the unworthy individual who has now the honour to address you; while the commissioners themselves called Mr. Parkes, the public auditor, as a sort of *amicus curiæ*, or expert in the construction of the Act of Parliament, to whom they put, on their own behalf, such questions as to them seemed good. The case submitted by the Imperial Company was extremely simple. We showed to them the amount of gas we should be called upon to supply in 1874, and we calculated it out in £ s. d. to show what that quantity would produce at 3s. 9d. per 1000 cubic feet. We estimated also—for, of course, all this is guess-work—what we were likely to obtain for our coke during the year. We added these things together, and we showed *per contra* the price we are bound to pay for coal during the first half of 1874 under contracts made in 1873, and also what we are likely to have to pay in the latter half of the year under contracts yet to be made. We then showed how much was due in order to enable us to make up our reserve-fund, in compliance with the Act of Parliament, and in the result we proved that there would be a probable deficiency of profit in 1874 of about £191,000. We also stated that 1d. per 1000 cubic feet upon our gas would give us a little more than £14,000 a year, the inference to be drawn from which was that we required an advance of something like 13d. per 1000 cubic feet to make up the £191,000. The case is still *sub judice*, therefore you will agree that it would be quite improper for me to make any comments upon it. I tell you simply the bare facts, which any one of you may ascertain for himself by reading the shorthand-writer's notes of the proceedings before the commissioners. Of course the Metropolitan Board, who only open their case to-day, have not as yet brought forward the objections they entertain to our application, but there is no difficulty in knowing, from the cross-examination to which we were submitted, what it is they rely upon. They say, "Of the advance you demand, a small portion only is due to circumstances which are not under your own control—viz., the advance in the price of coal, wages, &c." Another portion of our claim is to make up our reserve-fund, and that, I presume, they will contest, with what result we shall see; but they say that the remainder of our claim is due to interest which we ask upon capital imprudently, wantonly, and recklessly expended at Bromley, without due care and management. Now, gentlemen, our answer to that is twofold. In the first place we, as the lawyers say, demur to this plea. We say the commissioners have not under their control the expenditure of this capital. They must take the capital actually expended as a fact—they must take the audited accounts, and say what is the sum required to pay the legitimate dividends on our parliamentary capital. But putting aside that, we say that we have a conclusive answer on the facts and merits of our case. We say go down to Bromley and see the works there, and we defy any one who knows anything at all about the matter to say that a single £100 expended there has not been properly laid out—laid out, that is, with reference to the ultimate intention of the works, and the large scale upon which we shall be called on to supply gas, not merely next year, but in a not very remote future. They are works, no doubt, laid out for a large supply—works from which even this year we are likely to take not less than 7 million cubic feet of gas in 24 hours. We say that they are judiciously laid out, and we challenge inquiry as to whether a single shilling has been improperly expended upon them. Therefore, though, as a lawyer, I may be thought to love a demurrer, I say I am glad to know that we have an answer to the objections of the other side on the facts and merits of the case, and I look forward with confidence to the result of the inquiry. One or two bye-points were made, but I do not know how they may affect the minds of the commissioners. It has been said that we were guilty of a want of due care and management, inasmuch as that we had the option of raising capital under the Act of 1869 by 6 per cent. preference, or 7 per cent. ordinary shares, and have adopted the latter course. They say that inasmuch as 6 per cent. preference shares would have made a less charge upon the public than 7 per cent. ordinary shares, we are guilty of a want of due care in not issuing the former. Our answer to that is simply this—that the shareholders have the management of the matter, and that under the circumstances of the case it would have been very foolish on their part to put £1,300,000 of preference shares in front of their ordinary stock. Then they say that inasmuch as our 7 cent. ordinary shares are at a premium, it is clear that we could have floated them at less than 7 per cent. We say Parliament gave us the power to issue them at 7 per cent.; and, of course, we do not issue them at less. These, gentlemen, are the facts connected with this inquiry, and I will abstain from all comments upon them. You will have the conclusions before you soon. The commissioners are required to make their award within ten days after the hearing of the case; therefore, by the middle of March, you will be in possession of what they determine, through the medium of the public press, I do not think I have anything more to tell you, nor do I think it necessary to trouble you with any detailed particulars of the working of the past half year. Owing to circumstances altogether beyond our own control the working has been far from prosperous; but, on the other hand, we are now taking the steps which the law provides to reinstate ourselves, and I trust that as the price of coal diminishes we shall in the future find ourselves working again in the satisfactory manner we formerly worked. I now formally move—"That the report and accounts now read be received and entered on the minutes."

Mr. Barclay F. Watson (deputy-governor) seconded the motion.

The Rev. W. J. Langdale: Have the commissioners sent anyone down to inspect the Bromley works? It seems to me an important thing that they should do so.

The Governor: They have done what is better than that—they have been down themselves. They paid a visit to Bromley yesterday morning, accompanied by Mr. Kirkham on the one side, and by a gentleman whom the Metropolitan Board of Works appointed on the other side. What conclusions they came to, after seeing the works, of course we do not know.

Sir A. Brady: I have great pleasure in supporting the motion for the adoption of the report, and in doing so I wish to ask one or two questions. I find that several reports have been published in the newspapers respecting the mode in which the affairs of the company are conducted, which, I think, in some way or other, ought to be contradicted. There was a statement in one of the papers that our capital and revenue accounts were so mixed up that, it could not be distinguished before the commissioners, which was which. This seems such a strange charge to make against a company like this, that I am perfectly sure it cannot be true, and I should be glad to have it stated from the chair what the real facts are.

The Governor: I do not know to what particular paper the honourable shareholder refers, but I can only say that I am not prepared to acquiesce in all the statements which appear in the public papers, because, so far as my experience goes, about nine-tenths of the statements so made are generally to be taken as untrue. Unquestionably this is no exception to that rule. The statement that our capital and revenue are so mixed up as to be undistinguishable is simply and absolutely untrue, and was distinctly so shown by Mr. Parkes,

the official auditor, who was called by the commissioners themselves, and also by our own officers. I can only say that if they were so mixed up it would be proof that Mr. Parkes was a gentleman absolutely and entirely unfit for his important position, which everybody knows he is not. What was shown was this. For instance, we make a call, say, of £2 10s. a share; that call yields so much, say £130,000. That is paid in to the account of the new call, but after a time, when this call is pretty well paid up, it is carried from that to our general banking account. We are carrying on two things, a current business, day by day, and building operations connected with new works. All our money is paid into one purse, and is used indifferently for the daily expenditure and for the expenditure on buildings. But the instant it is spent on the one or the other it is carried to its proper account. Nothing could be more ridiculous than to put the money into separate purses, and perhaps have to go borrowing from our bankers for what we wanted on the one or the other. We keep one banking account, but the two things—capital and revenue—are kept as separate as possible in our books, and no one in the least conversant with money matters could confuse them. I suppose the writer in the paper referred to, like many others, knew very little what he was talking about.

Sir A. Bradey: I am very glad to have elicited this statement. I was quite sure it was as the governor has stated. I did not for an instant believe that this company—one of the best-managed in the kingdom—could have such a charge substantiated against them, but for the honour of the company I thought it right to ask the question. With regard to our affairs generally, I hope the directors will find themselves before long in a position to make such coal and other contracts, that we shall not be compelled to dip so largely as we have done into our reserve-fund, which I see is now reduced to about £27,000.

The Governor: The directors entirely accepted the question of the honourable proprietor in the spirit in which it was put. But every one who gives any consideration to the question must see that no company having an official auditor could do such a thing as was alleged by the writer of that statement. I am glad, however, that the honourable proprietor gave me the opportunity of making the explanation.

The motion was put and carried unanimously.

The Governor moved—"That the following dividends be now declared for the half year ending on the 31st of December last—viz., at the rate of 10 per cent. per annum on £1,560,000 consolidated stock; at the rate of 7 per cent. per annum on 52,000 £12 10s. shares fully paid; on £26,000 £12 10s. shares (1872) £7 10s. paid since the 1st of July, £10 paid from the 1st of August, and £12 10s. paid from the 1st of October, 1873; and on 26,000 £12 10s. shares (1873), on which £5 was paid on the 22nd of December last; and that the dividend, as above, be made payable on Monday, the 2nd of March next."

Mr. Watson seconded the motion, which was put and carried.

The Governor moved the re-election of Mr. Ulick John Burke as a director, and the motion having been seconded,

Mr. Saywell expressed his regret that some of the directors were not members of Parliament. In an important company like this, in which such great interests were at stake, circumstances were continually arising, as with railway companies, in which it seemed highly desirable that some one, in a sense representing them, and conversant with their affairs, should have a seat in the Legislature.

The Governor said that personally he had no desire for a seat in Parliament, but if Mr. Saywell had stated his views a month before, instead of a month after the general election, possibly some of his colleagues might have rushed to the hustings.

The motion was put and carried.

On the motion of the Governor, seconded by Mr. J. St. George Burke, Mr. R. Temple Frere, was re-elected a director.

On the motion of the Governor, seconded by Mr. R. Temple Frere, Mr T. Paine was re-elected a director.

On the motion of the Governor, seconded by Colonel Creed, Mr. G. Pownall was re-elected a director.

On the motion of the Governor, seconded by Mr. C. Frere, Mr. R. S. Mansell was re-elected an auditor of the company.

The Rev. W. J. Langdale asked whether the company had much outlying district yet unoccupied which would hereafter require a supply of gas.

The Governor said the annual increase of reutal varied considerably. Sometimes it was as much as 6 or even 8 per cent. This, of course, marked the gradual extension of supply. On the confines of their district buildings were going forward, and people were also taking more gas now, in proportion to the population supplied, than formerly. It was entirely in the belief that an increase would take place in the demand that the new works had been undertaken at Bromley.

Sir A. Brady proposed a vote of thanks to the chairman. The proprietors, he said, were not only indebted to the governor for the ability with which he had presided over the business, but for his unremitting attention to the interests of the company. He begged also to include in the vote the distinguished body of gentlemen, the directors, who, though not M.P.'s, were entitled to the hearty acknowledgments of the meeting for the care they bestowed upon the duties of their office.

Mr. Saywell seconded the motion, which was put and cordially adopted.

The Governor: Gentlemen, on behalf of my colleagues and for myself, I thank you sincerely for the way in which you have acknowledged our services. I attach more importance than usual to the vote on this occasion, because we are, unquestionably, not in the state of prosperity we enjoyed for many years, arising, however, from circumstances over which we have no control. I hope we shall see a return of good times, but depend upon it, whether we are prosperous or not, we shall give our most unremitting attention to your affairs in the future, as we have done in the past.

The proceedings then terminated.

WOLVERHAMPTON GAS COMPANY.

The Half-Yearly Meeting was held on the 24th ult.—Mr. J. Underhill in the chair.

The Secretary (Mr. A. Jones) read the following report:—

In presenting the 44th half-yearly report, it is the pleasing duty of your directors to lay before you the balance-sheet and general account, duly certified by your auditor, showing the revenue for the half year ending the 31st of December to be £24,587 13s. 7d., and the expenditure £19,591 2s. 2d., leaving a balance of £4996 11s. 5d. From this your directors recommend the payment of the usual 5 per cent. dividend, payable forthwith, if approved by the meeting.

At this meeting three of your directors retire by rotation—namely, Mr. George Cox, Mr. Benjamin Savage, and Mr. Moses Ironmonger—but offer themselves for re-election.

Your auditor, Mr. Benjamin Smith, also retires, but offers himself for re-election.

Your directors, in conclusion, beg to assure you they will continue to devote their best attention to the interests you have confided to their care.

The Chairman, in moving the adoption of the report, said it must have struck the shareholders, as it had struck the directors, with very great pleasure, to know that, in spite of the untoward circumstances of the last year, they were able to pay the usual dividend, and take over a balance to the next half year's account, even though it was but a small balance. During the past year the directors had been caused very great anxiety in consequence of the unprecedented advance in the price of coal, which they had hoped would only be a temporary matter. The increase had continued without cessation from the beginning to the end of the year; in fact, it had rather increased, as it had gone on, than diminished. He thought, when he had read a few figures which he had extracted from the company's books, they would see how very much it had been a matter of anxiety to the directors. They paid for coal during the year 1871, £13,447; in 1872, £17,178; in 1873, £24,773, or a total of £55,398. It would be seen that in coal alone between 1871 and 1873 there was an increase of £11,300. It might be said by some of them, that there had been an increase in the consumption of gas, and that might in some measure neutralize the increase in the cost of coal. He had also taken the figures for the gas-rentals during the same period. In 1871 the gas-rentals were £23,458; in 1872, £24,976; and in 1873, £28,016; giving a total of £76,450. Therefore it would be seen that between 1871 and 1873 the increase in the gas-rentals had been only £4600, while the increase in the price of coal had been £11,300. The directors had to take all things into consideration, and their first duty was to the shareholders, so that their dividends could, as far as possible, be maintained intact. The position of the general public had next to be considered, and there was considerable anxiety felt by the directors as to whether the price charged to their customers for gas ought not to be increased. The price of gas had been raised by other companies almost throughout the country, varying from 3d. to 1s. per 1000 feet, and in some cases even more than that, but he was happy to say the directors had been able to carry on the business of the company without advancing the price of gas during the past twelve months beyond 2s. 9d., notwithstanding the high price of coal, and the quality had been about the same as usual. He thought they must all acknowledge that this was a thing which was almost unprecedented, and he thought they would confirm what the directors had done, and say that they had acted wisely in not advancing the price of gas during the past year. There seemed at the present time a little disposition to give way in the price of coal, and although they had no guarantee as to what might be the position of the company during the ensuing year, and make no promises on the subject, still under any circumstances he did not believe that the price of coal would exceed what it had been during the past half year. There had been an advance during the half year in the price of coke, and an advance also of several other products; the directors had also exercised very great economy in the manufacture of gas, and this was one reason why they had succeeded so well. He believed, generally speaking, there had been few complaints as to the gas supply. There had been a few complaints in the town, but on examination it had been found that the cause of complaint was some local defect, which had been put right immediately the attention of their officials was called to it. That, so far, was satisfactory. With respect to the supply to the outlying portions of their district, there had been a few more complaints with respect to the supply there, but he might tell them that the directors intended, so soon as the weather permitted, to make such alterations in the mains as would, they believed, obviate any cause of complaint in the future. The chairman concluded by formally moving the adoption of the report.

Mr. Cox seconded the motion, which was carried unanimously.

On the motion of the Chairman, the dividend recommended in the report was ordered to be paid, and the three retiring directors, whose names are mentioned above, were all re-elected. Mr. B. Smith was also reappointed auditor.

On the motion of Mr. Warner, seconded by Mr. Lloyd, a cordial vote of thanks was passed to the chairman and directors for their services during the past year, and acknowledging their continued attention to the interests of the company.

The Chairman briefly responded, and the proceedings terminated.

BERLIN WATER-WORKS COMPANY, LIMITED.

The Annual General Meeting was held at the London Tavern, on Friday, Feb. 20—J. C. Sim, Esq., in the chair.

The following report was submitted:—

The directors have now the pleasure of submitting to the shareholders of the Berlin Water-Works Company their annual report of the proceedings during the past year, and the progress of the negotiations with the municipality of Berlin for the sale of the works and property of the company.

In doing this they must refer the shareholders to their circulars of the 19th of December and the 2nd of January last, in the latter of which they stated that the chairman, Mr. Sim, was in Berlin for the purpose of completing the contract for the sale of the works, and for obtaining a discharge from the Crown of the obligations of the concession binding on the company. The terms for the sale of the water-works were agreed between the municipality and the board in December last. But delay occurred in obtaining the discharge from the Crown (as explained in the board's circular of the 2nd of January); and when the terms of the arrangements between the Crown and the municipality had been settled, a new difficulty arose in the circumstance that the company were required to agree the amount of compensation to be paid to the *employés* of the company in Berlin, other than the claims of Mr. Gill, and Dr. Gaëbler, which were excepted by their own desire. The chairman (who had remained in Berlin for the purpose of completing the contract, and removing any obstacles that might arise) was enabled, with the co-operation of the local directors, to deal with this new difficulty by agreeing to leave the question of the amounts to be paid by way of compensation to the company's officers to the decision of the state commissary, Herr von Madai, a gentleman of the highest standing and independence, whose award has since been made.

The board think it right to add that the company's engineer and manager, Mr. Gill and their official representative in Berlin, Dr. Gaëbler, preferred to leave their claims to compensation in the hands of the board of directors, and both these gentlemen have rendered valuable assistance to the chairman in meeting all the difficulties as they arose; but it is to be regretted that these delays should have arisen.

The sum of £1,200,000 received simultaneously with the signing of the contract, paid over to the company on the condition referred to in the circular of the 2nd of January, has been deposited, pending the receipt of the Crown's discharge, by arrangement, in the London Joint-Stock Bank, at interest, and is ready to be divided as soon as legal formalities permit.

In the meantime, the board propose at once to pay the shareholders the half-yearly dividend up to the 31st of December last. The sum available for this purpose is the balance remaining in their hands undivided on June 30, 1873, and a sum equal to the sum agreed to be received as interest on the purchase-money from the 1st of July to Dec. 31, 1873, instead of the net profits of working for that period. This will enable the board to pay a dividend of 12s. 6d. per share for the half year, being at the rate of 12½ per cent. per annum on the capital of the company.

The board had hoped to have been enabled, at an extraordinary meeting to be held after the present meeting, to have passed the first of two resolutions necessary to place the company in liquidation, a step which they are advised is necessary to enable them to make a return of capital. But in consequence of the delay in issuing the Crown's discharge, the extraordinary meeting is necessarily delayed.

The board are unable to append to this report the usual accounts by reason of the local committee at Berlin not having yet adjusted them with the municipality of Berlin.

The Chairman said the directors had delayed the calling of the meeting in order that they might be able to report, if possible, the settlement of the contract for the sale of the undertaking. At this meeting, held in conformity with the deed of settlement, the annual accounts should be exhibited, but the directors were unable to do more, in the present position of affairs, than show such accounts as proved that the company could pay the dividend recommended. The delay in settling the accounts was connected with the general winding up of the company. As a condition of the treaty negotiated with the municipality, it was provided that the company should carry on the works from the 1st of July last at the costs and charges, and for the benefit of the municipality, and that they should themselves receive six months interest on the sum agreed to be paid on the transfer of the property. From the amount of interest so due the company could dispose of £30,000 for the present dividend. In addition to that sum, it would be seen, from the half year's accounts presented at the last meeting, that the payment of the interim dividend in August last would leave a balance of revenue account in hand, a moiety of which belonged to the shareholders. That moiety was about £7500, and the two sums together enabled them now to declare a dividend of 12½ per cent. Referring to the sale of the works, he might state that he went to Berlin in December last to complete the negotiations, and on the 31st of that month the contract was signed to transfer the undertaking to the municipality for the sum of £1,250,000, and a sum of £1,200,000

was handed to him on account of the purchase, which sum had been deposited in London. The remaining £50,000 would be paid on the final completion of the busin.. ., and the obtaining of a release by the Crown. Having parted with the great property of the shareholders and all the rights of the company under the concession, the directors felt it was indispensable that they should obtain a discharge from every liability. Pending the release of the Crown, the money was to be on deposit, and would be returned to the Corporation of Berlin, who would retransfer the property should any impediment to the completion of the bargain occur. On the 19th of January His Majesty signed the release to the company; but conditions were attached to it, in consequence of a remonstrance put in by the *employés* of the company that their compensations, which had been provided by the municipality, had been reserved in hand. The settlement of the matter was referred to a nobleman, who accepted the appointment, and in the course of a week decided the amount of money due to these officials, in a most satisfactory manner. But there was still another little delay, arising from the wish of the Government to issue a new concession to the municipality simultaneously with the release of the company. These points were now all settled, and the directors had given notice of an extraordinary general meeting of shareholders for the 3rd of March, to decide upon the winding-up of the company. On that occasion they hoped the accounts would be in a forward state, so that they could show the exact position of affairs. He concluded by moving the adoption of the report.

Mr. GOSCHEN seconded the motion, and alluded in feeling terms to the loss the company had sustained by the death of Mr. Pickersgill Cunliffe. That gentleman was connected with the undertaking almost from the very first, and it was melancholy to think that he had not survived to witness the successful issue of the negotiations in which he took so large and able an interest.

The motion was put and carried, and on the motion of the chairman, it was resolved—"That a dividend for the half year ending Dec. 31 be declared at the rate of 12½ per cent. per annum, free of income-tax, payable on and after the 26th inst. to the shareholders registered on the 14th inst."

The election of Mr. C. K. Freshfield, M.P., to the office of director, in room of the late Mr. Pickersgill Cunliffe, was confirmed, and Mr. Rücker, a retiring director, was re-elected. The retiring auditor was also reappointed.

A vote of condolence with the family of the late deputy-chairman was then agreed to, and the directors were requested to communicate the same.

The CHAIRMAN and Mr. FRESHFIELD replied to several questions relating to the transfer of the business of the company and the compensation of the *employés*, and

On the motion of Mr. CURTIS, seconded by Mr. SOLOMONS, it was resolved—"That the compensation to Mr. Gill (the company's engineer) and Dr. Gaebler, and to any other officers in Berlin not included in the award of the State Commissioner, be left in the hands of the board of directors."

A vote of thanks to the chairman and the directors closed the proceedings.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.

The Annual Meeting was held at Sunderland on Tuesday last—Mr. R. VINT in the chair. The report of the directors was as follows:—

The gross income of the company for the year has reached £41,045 18s. 9d., being an increase over the preceding year of £2996 11s. 4d., but your directors regret that the working expenses have largely increased, owing to the extensive repairs to the engines and boilers at the Cleadon station, and to the continued high price of coals, wages, &c. In consequence of the large and increasing demand for water by manufacturers in the north part of the district, your directors have been compelled to lay down an additional main to Hebburn of 18 inches diameter, and it remains a matter for their serious consideration, whether the time has not arrived for a further revision of the tariff, so far as the manufacturers of the district are concerned. The new reservoir at Seaham pumping-station is finished, and is found to be of great service in the storeage of water for the more regular supply of that part of the district, and the new reservoir on the top of Humbledon Hill is nearly completed, and a connexion will as soon as possible be made for the supply of the Hylton district. Your directors have commenced the new works at Dalton, and one of the shafts is now sunk to a depth of 40 fathoms. Your directors recommend a dividend of 4¾ per cent. for the half year ending Dec. 31, 1873 (clear of income-tax), which, together with the dividend paid the preceding half year, will make 9½ per cent. for the year. The retiring directors are Messrs. Vint, Stokoe, Swinburne, and Richardson, and the retiring auditor, Mr. H. G. Armstrong, all of whom are eligible for re-election.

The CHAIRMAN, in moving the adoption of the report, said the accounts showed a considerable increase in the working expenses, owing to the rise in the price of coal. That for which they formerly paid 5s. per ton they had been during the last year paying 15s., and though there was some probability of a reduction, they could hardly venture to hope that they would ever see coal again at 5s. per ton. Their coal and cartage account had amounted to £7550, being £2000 in excess of the amount of the previous years, while in 1871 the whole amount for coal and cartage was only £2000. The item of repairs was £1500 in excess also, but that was exceptional, and due to the overhauling of the engines at Cleadon, which would now run for a considerable time without any need for attention or repairs. On the other side of the account their water-rents had amounted to £41,045, against £38,049 in the previous year—an increase of over £3000. That was certainly gratifying, and more than they had anticipated; and looking to the general balance, they found considerable addition again to their capital from works which they had been compelled to undertake. Owing to the increased demand for water in the Hebburn district, largely owing to the opening out of Boldon Colliery, with its large population, they had been compelled to lay down a new 18-inch main through East Boldon, and thence across the country. The Hylton district was now pressing them, and, in fact, the constant demand over all their area had induced them to decide on the construction of new works at Dalton-le-Dale, where they had reason to believe an unusually large quantity of water would be obtained. For these proposed new works their engineer, Mr. Hawksley, had furnished them with plans and designs, which, in addition to pumping shafts, included a reservoir capable of holding 4,000,000 gallons of water and a 24-inch main laid down to join the company's district at Ryhope. Their balance amounted to £17,749, of which £11,162 would be absorbed by the half-yearly dividend of 4¾ per cent., leaving £6586 17s. 4d. to carry forward. The business of the company had been as economically managed as it could have been consistently with the interests of the shareholders on the one hand and the public on the other; and, though they might not yet have reached the minimum of waste, he believed they were now getting pay for a larger per centage of the water they pumped than they ever did before.

Mr. ANDERSON (South Shields) believed they would find an ample supply of water at the proposed new works at Dalton, for he remembered some friends of his who, 20 years ago, attempted to sink a pit there, but failed, after spending a large fortune, owing to the quantity of water which they encountered.

Mr. M'DONALD suggested the adoption of the new and improved engines, boilers, and pumps now in vogue, and which, he was sure, would tend very materially to an important saving of fuel.

The CHAIRMAN said they might take credit to themselves for the fact that their company had developed the manufacturing resources of the south bank of the Tyne, which could never have been what it now was but for the adequate supply of water with which that company had furnished it. The increase was so great that it was impossible they could have foreseen it. At one time they considered a 3-inch main to Jarrow ample, next they got to an 8-inch, then to a 12-inch, and now to an 18-inch, which they hoped would satisfy the requirements of the district for some time to come. With regard to Seaham, they were now getting a revenue of from £900 to £1000 a year. At the new works at Dalton in that district they had already sunk down to 45 fathoms, and at 44 fathoms 1 foot they found water, and they had every reason to believe that their most sanguine anticipations would be realized.

Mr. W. MOOR, solicitor, in reference to the pending appeal by the owners of the tenemented property, expressed his conviction that the result would be in favour of the company.

Mr. HALL (South Shields) said there had been a large increase from Hebburn to the extent of £2000. At Boldon Colliery there were hundreds of houses yet to supply, and as pitmen have generally large families they might rely upon a still further increase in the number of their water consumers.

Mr. HAWKSLEY, C.E., also addressed the meeting on the condition of their works, of which he gave a most satisfactory report. Such, he said, was the demand in the Tyneside district for water that there was not enough north of the Wear to supply it, and the deficiency must therefore be made up from the district south of the Wear, and by such extensions as that which they now proposed at Dalton. As long as they had coals in that district they would have an increasing amount of manufacturing, and men who came to be employed in their manufactories would bring wives and create a large population.

The chairman and directors were re-elected, the dividend declared, the report adopted; £25,000 was ordered to be raised by the creation of new shares, the latter to be sold by auction.

The CHAIRMAN, in returning thanks for his re-election as a director, mentioned that he was elected exactly 23 years ago, and he had to thank the shareholders for a continuance of their confidence.

Other resolutions having been adopted and carried, the company adjourned for luncheon, which took place at the Queen's Hotel, where an admirable repast was served up by Mr. Shiel, in his accustomed first-class style. The usual loyal and other toasts were duly honoured, and the chairman then gave place to Mr. Bulman, auctioneer, who proceeded with the sale of 2000 new shares.

The AUCTIONEER referred to the position and prospects of the company, to the fact that their selling powers will soon come to an end, and to the gratifying circumstance that at the last sale the shares reached the high average of £10 1s. 0½d. He then proceeded with the sale, and, after a sharp competition, the result was found to be as follows:—

Shares.	Price.	Amount.
200	£10 1 0	£2,010 0 0
200	10 0 6	2,005 0 0
456	10 0 0	4,560 0 0
282	9 19 6	2,812 19 0
862	9 19 0	8,576 18 0
2000		£19,964 17 0

This gives an average of a fraction over £9 19s. 7d. for each £5 share.

METROPOLIS GAS SUPPLY.

PADDINGTON.—At the meeting of the vestry on the 17th ult., it was resolved that the tender of Messrs. Parkinson and Co. for the undermentioned works be accepted, subject to their signing such a contract as the solicitor may advise—viz, for the supply of 140 cast-iron meter-boxes, and wet gas-meters of the compensating principle, in cast-iron cases, as described in the specification, at £5 12s. 6d. each; for supplying and fixing a cock, governor, and burner complete, properly adjusted, 5s. 6d. each; for the examination of all the present cocks, governors, and burners, about 1700, and repairing and adjusting all defective ones, and refixing same, 3s. each; and for the repair of the meters and cast-iron boxes annually, 3s. 6d. each. It was also resolved to re-advertise for tenders for the following works:—For connecting the above 140 meters with the main service, making good all the necessary connexions with stand-pipe, including a stop gas-cock and spanner to each inlet-pipe; for the examination, testing, repair, and refixing of 1700 cocks, governors, and burners, annually; for keeping in good repair all the lamp-columns, brackets, chairs, and lanterns, annually; for painting all lamp-columns, brackets, chairs, and lanterns, annually.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the gas consumed in Marylebone during the month of January:—

—	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogen.
	*Mean of 25 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas	15·98	16·41	15·50	20·71	9·82	25·05	0·76	None.
Chartered Company's common gas.	16·12	16·90	15·84	30·33	13·61	16·75	0·40	None.
Chartered Company's cannel gas	20·34	20·70	19·76	18·81	11·94	21·33	0·78	None.

Mean of daily readings of barometer . . . . 29·93
" " " thermometer . . . 56·52

* Each observation consists of ten readings of the photometer, at intervals of one minute.

During the month the mean illuminating power of the gas supplied by the Imperial Company was equal to the light of 16 sperm candles; it ranged between 16·41 and 15·50 candles. The mean quantity of sulphur contained in 100 cubic feet of this gas was 25·05 grains, and of ammonia 0·76 of a grain. The mean light of the common gas of the Chartered was equal to rather more than 16 candles; it ranged between 16·90 and 15·84 candles. On 18 occasions it exceeded 16 candles. The mean quantity of sulphur formed in it was 16·75 grains, and of ammonia less than half a grain. The mean light of the cannel gas was equal to rather more than 20 candles; it ranged between 20·70 and 19·76 candles. The mean amount of its sulphur impurity was 21·33 grains, and of ammonia 0·78 of a grain. The pressure of all the gases was generally fair, and no trace of sulphuretted hydrogen was found in either of them. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas manufactured at their works, Beckton and Bow.

METROPOLIS WATER SUPPLY.

Dr. Whitmore's report on the composition of the Thames companies and other waters as supplied in Marylebone during the month of January:—

—	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by incineration of Solid Matter in previous column.		Hardness before boiling in degrees.	Hardness after boiling in degrees.
	Jan., 1873. 0°	Jan., 1874. 0°	Jan., 1873. 0°	Jan., 1874. 0°	0°	0°
Distilled Water . . .						
West Middlesex water .	20·44	20·76	0·96	0·84	13·93	3·16
Grand Junction water. .	20·86	20·96	0·94	0·96	14·02	3·21

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

The water supplied to the parish during the month by the West Middlesex and Grand Junction Water Companies was generally bright and clear; on one occasion that supplied by the former company was of a very slight yellow tinge, but, as regards the amount of solid matter (organic and inorganic), contained in the water of both companies, it was somewhat less than the in previous month. The average daily supply for each inhabitant of the parish was about 30 gallons.

IMPERIAL GAS ACT, 1869.

BOARD OF TRADE COMMISSION.

Commissioners—F. S. REILLY, *Esq.*, *Chairman*; *Professor* ODLING, *F.R.S.*, *and* W. P. PATTISON, *Esq.*

(Continued from page 253.)

The commissioners resumed their sittings on Thursday last, when Mr. Kirkham was recalled by them, and made some slight corrections in his evidence as to the cost of purification. Mr. Chubb, the secretary, was also recalled by them, and produced the information asked for as to the cost of the works required by the Lea Conservancy Board to be done. He produced, also, a statement of the loan capital, from the incorporation of the company to the 31st of December last; a table showing the total cost of purifying gas in 1873, as separated from the item "Sundries," in connexion with which it had stood in the analysis of the company's accounts. A further table was handed in, showing the cost of purifying at the Pancras and Shoreditch stations in the two last years; and, finally, a statement of the capital invested in mains on the 30th of June, 1857, and the 31st of December, 1873. The witness was examined by the commissioners and by Mr. Cripps as to the capital raised by way of loan, and afterwards converted into shares, which he explained had been done under the powers of their Act of 1854. The case for the Metropolitan Board of Works, in opposition to the company's application, then commenced, the learned counsel who appeared for the board preferring to call his witnesses before addressing the commissioners. The witnesses called were Mr. George Anderson, gas engineer, of Northumberland Street, and Mr. John Somerville, late engineer of the Alliance and Dublin Gas-Works. The first points to which the evidence of Mr. Anderson was directed were the costly and unsuitable character of the company's new works at Bromley, upon which Serjeant Sargood interposed, and said he had no objection to the reception of evidence having reference to the mode of raising and applying capital; he did not wish to deprive the commissioners of the opportunity of hearing the evidence, but he wanted it to be distinctly understood that he regarded it as quite *ultra vires* for the commissioners to investigate that matter. The Chairman said the commissioners quite understood the position of Serjeant Sargood with regard to the question. Should they, after hearing the argument that might be advanced on both sides, decide that the mode of raising and dealing with capital did not come within the scope of this inquiry, they would disregard the evidence. Serjeant Sargood said he did not wish to exclude the evidence, but believing it to be wholly beyond the scope of the inquiry, he should decline to cross-examine upon it. Mr. Anderson's examination being resumed, he gave his views as to the way in which the works should have been laid out, and his estimate of the cost which should have been incurred. He then dealt with the question of purification, and the system at the Imperial works, which he considered defective and costly as compared with the process adopted by himself at Dover. As regards the cost of coal, he considered that 21s. per ton was a fair estimate for the current year, inasmuch as the coal market was falling. At the present time he could get coal in London for less than 21s.; and he was receiving letters every day offering coals for sale, and he argued from that circumstance that the supply was increasing, and that the price would probably be reduced. Estimating coal at the sum which he had mentioned, and taking the residual products at their fair marketable value, he believed that the difference between expenditure and income would amount to £205,000, and that an increase of from 2½d. to 3d. per 1000 in the cost of gas would be sufficient to make up a 10 per cent. dividend. The evidence of Mr. Somerville was an echo and confirmation of Mr. Anderson's.

On Friday, a person from the St. Pancras Baths gave some evidence as to the price charged by the company for their coke, after which Mr. Keates, the superintending gas examiner of the Metropolitan Board of Works, deposed to the average illuminating power of the gas supplied by the Imperial, South Metropolitan, and Chartered Gas Companies, which are the three companies coming within the limit of the board's testing powers. He also handed in a statement, compiled from returns made to him, of the price and quality of the gas supplied by the metropolitan companies, who are not subject to the Act of 1868 and 1869. He was examined in reference to purification, and stated that where companies are forced to comply with the instructions of the referees on the sulphur question, it was absolutely necessary that, in addition to the oxide process, they should use lime or some equivalent. Mr. Cleminshaw, formerly manager of the Manchester Gas-Works, stated that from his experience the cost of purification by the Imperial Company, which had been given at 10½d. per ton of coal, might be reduced more than one-half, and by proper arrangements might be brought down to 4d. He agreed with Mr. Anderson in thinking that the works at Bromley had been laid out on too expensive a scale; but he had not examined the plan suggested by Mr. Anderson sufficiently to be able to say whether it would be an improvement. Mr. H. Jones, engineer of the Ratcliff Gas Company, gave evidence as to the results of their working. In reply to Dr. Odling, he expressed the opinion that working with stage floors was cheaper, so far as labour went, than working on the level. The cost of fuel was, however, greater, and he believed the extra cost of construction would more than counterbalance any advantage to be derived from the system. He had seen the works at Bromley, but did not feel competent, from the inspection he had made, to pronounce an opinion upon them. Mr. Gunn, accountant of the Metropolitan Board of Works, stated that he had examined the accounts of the Imperial Company for the last five years, and had prepared returns, showing the cost of manufacture and working expenditure for those years. Upon these he had based an estimate of the total cost for the current year. According to his calculations all that the company require to make up their dividend this year is an advance of 3d. per 1000 in the price of gas, assuming that they are not allowed also to fully make up their reserve-fund. If the latter is to be added a further advance of 3·7d. must be allowed. This evidence closed the case for the Metropolitan Board, and Serjeant Sargood then called Mr. J. W. Field, accountant of the Chartered Company, and Mr. W. Morton, engineer of the London Company, to show what effect an increase in price had upon the consumption of gas. Mr. Kirkham was also recalled, in reply to Mr. Anderson's evidence as to the plan of constructing the Bromley works, and the mode of purification he recommended.

On Saturday, Mr. Kirkham having been recalled to supply some further information as to the necessity for certain items of expenditure at Bromley, Mr. Cripps proceeded to address the commissioners. He maintained that the commissioners were bound, in arriving at a decision upon the application of the company, to take into consideration the past history of their undertaking, so as to ascertain that "due care and management" had been exercised by the directors. The company were asking for an increase of 13d. in the price of gas, and the question was, what proportion of that increase was necessitated by the rise in the cost of materials and labour required in the manufacture. Taking the expenditure, not of the last year, which he contended was exceptional, but the average of the previous four years, they were not entitled to the advance they sought. He asserted that the new capital had been improvidently raised, that the purification charges were excessive, and that, while the estimates for the current year with reference to the coal market had been exaggerated, the increase in the consumption of gas had been underrated. He concluded by submitting that it could not have been the intention of the Legislature that the deficiency in the reserve-fund should be made good out of the profits of any one year. Serjeant Sargood, in replying on behalf of the company, maintained that the duty of the commissioners was solely to determine what price for gas would yield the shareholders in the company (due care and management being exercised in the conduct of the business) the statutory dividend. Those words, "due care and management," applied merely to the earning of revenue, or, in other words, the production of gas; and the method of raising or expending capital did not enter into the inquiry. At the close of the address, the commissioners intimated that their decision would be given within the period of ten days.

FRIDAY, FEB. 20.

The CHAIRMAN said the commissioners had received from the Board of Trade a memorial from gas consumers in Holloway and other parts of St. Mary's, Islington, signed, on behalf of a public meeting, by Mr. Torrens, M.P., which had better be seen by both parties.

Serjeant SARGOOD said he did not know that he had any concern with the memorialists. If they were within the company's district they were represented by the Metropolitan Board of Works; if without it, he had nothing to say to them.

Mr. *Field* recalled, and examined by Serjeant SARGOOD.

I have prepared a statement of the floating capital of the various metropolitan gas companies for 1870, 1871, 1872, and, as far as I could, for 1873. I obtained the information from the printed accounts of each company. Under each year there is a double column. First I put large sums of floating capital, and then say *plus* the uninvested balances of undivided profits. Under that heading the Imperial Company have "None," because for each of those years the company have not earned profit enough to pay their dividend, and therefore they were trenching on their capital for the revenue expended. Other companies I find have got large balances at the end of each year beyond the amount sufficient to pay the dividend for the half year ending in December.

Serjeant SARGOOD: When you talk of infringing on capital for revenue expended, you mean infringing on the reserve-fund?

Witness: We ought to have a floating capital.

Serjeant SARGOOD: But you said your floating capital was a sum of money of a mixed character, not divided at your bankers, but capital and revenue; and, therefore, what you mean is, that you were using your floating capital for the purpose?

Witness: Yes.

Examination continued: When the companies, in addition to their floating capital, have certain balances of undivided profit, I have stated those balances. Under each head I have shown what it comes to at per 1000 cubic feet. The figures represent the amount which stands to the credit of the particular account; they do not necessarily mean that the sum of hard cash is in hand lying idle. The Imperial Company received a large sum last December, which comes in under the heading of capital account.

Serjeant SARGOOD: Not being mixed in common with all the other funds, before many days or weeks have elapsed after Jan. 1 your bankers balance had diminished?

Witness: Yes; considerably. It was drawn down, just before we raised that capital, to £20,000, and in several weeks it was under £5000—much too low for us—and we were prevented from paying many of our contractors. We were obliged to ask them to postpone their claims for payments due to them till we had raised this capital.

Serjeant SARGOOD: There is no evidence of poverty, and therefore it may be admitted that it is not infrequent you are indebted to your bankers?

Witness: Yes. Our balance to-day is drawn down to £260.

Serjeant SARGOOD: So that it is not a sequence from the appearance of these large figures that they represent money which is idle or unproductive?

Witness: Certainly not.

The following document was handed in:—

A Return of the Floating Capital of each of the Metropolitan Gas Companies on the 31st of December in each of the Years 1870, 1871, *and* 1872.

1870.

Name of Company.	Floating Capital. Amount.	Floating Capital. Per 1000 Feet.	Plus the Uninvested Balances of Undivided Profit. Amount.	Plus the Uninvested Balances of Undivided Profit. Per 1000 Feet.	Amount used for Floating Capital. Per 1000 Feet.
	£	s. d.	£	s. d.	s. d.
Imperial	177,388	1 2	None.	..	1 2
Chartered	170,274	1 5	None.	..	1 5
Commercial	35,805	1 0	None.	..	1 0
Independent	13,064	0 7	3,000	1 2	0 8½
Ratcliff	6,055	0 9	4,800	0 7	1 4
London	6,601	0 2	19,000	0 5	0 7
Phœnix	12,869	0 3	31,000	0 7	0 10
South Metropolitan	36,621	1 3	..	..	1 3
Surrey Consumers	..	..	4,776	0 3	0 3

1871.

Imperial	140,121	0 10	..	..	0 10
Chartered	135,408	0 10	..	..	0 10
Commercial	34,459	0 11	7,000	0 2	1 1
Independent	13,600	0 7	8,000	0 4	0 11
Ratcliff	6,055	0 9	5,600	0 8	1 5
London	15,837	0 4	..	..	0 4
Phœnix	15,983	0 3	32,000	0 7	0 10
South Metropolitan	31,092	1 0	..	..	1 0
Surrey Consumers	..	..	4,200	0 7½	0 7½

1872.

Imperial	133,315	0 10	..	..	0 10
Chartered	158,435	0 10	..	..	0 10
Commercial	26,509	0 8	9,000	0 3	0 11
Independent	16,704	0 9	4,000	0 2	0 11
Ratcliff	5,568	0 7	9,400	1 0	1 7
London	19,633	0 5	..	..	0 5
Phœnix	20,332	0 5	35,000	0 8	1 1
South Metropolitan	26,052	0 10	..	..	0 10
Surrey Consumers	5,483	0 4	7,500	0 5	0 9

For the year 1873:					
Imperial	307,511	1 9	..	..	*1 9
			Borrowed.		
Chartered	263,439	1 4	40,000	0 2	1 6

* From the floating capital of the Imperial for 1873 deduct 3d. per 1000 feet for the £41,647 deficiency of profit for the dividend, thus reducing the amount per 1000 feet to 1s. 6d.

Cross-examined by Mr. CRIPPS: I shall not have an opportunity of completing that table for two or three months. In our cash accounts, revenue and capital are entirely mixed up together, and no distinction is kept between them.

Mr. CRIPPS: Is there any distinction at all in your accounts with reference to floating balance—whether that is a floating balance on capital, and to be expended on works, or a balance of revenue due to the profit and loss of the particular year.

Witness: Our books show the balance due on capital account and the balance due on revenue account. The cash is mixed up together, but in our books the accounts are as distinct as they can be.

Mr. CRIPPS: In the return handed in the balance we are dealing with was a balance of the capital account.

Witness: Yes. That balance means a sum which may be drawn upon for capital expenses.

Mr. CRIPPS: Have you anything which will show what amount is attributed to the carrying on the manufacture and distribution of gas from time to time as a floating capital, and how much of it is due to the carrying on your expense—say Beckton or elsewhere; it is capital expense?

Witness: The whole of that amount is liable to payment for all capital charges; but we must have a certain portion of capital floating to carry on our business.

The CHAIRMAN: Is your distinction between the current operations of the company and the execution of permanent works?

Mr. CRIPPS: Quite so; one being capital raised for the purpose under an Act of Parliament, and going to certain works—that is capital.

The CHAIRMAN (to witness): Will you answer the question with regard to that distinction?

Witness: We keep but one cash account at our bankers, and we draw on it; and as the accounts are drawn upon they are charged to the capital account, or the other account, as the case may be. All these things go before the official auditor, and he sees that they are properly charged to revenue or capital account.

Mr. CRIPPS: Do you use the amount which you get on calls under the Act of Parliament for making works for the purpose of carrying on your trade as traders?

Witness: We should do it, as we use our revenue account to pay for capital. I expect other companies do the same as ourselves, but I have not inquired.

Re-examined by Serjeant SARGOOD: Our accounts show how much we spend on capital, and how much in the current expenditure of our trade. Those accounts are duly audited, and the figures I have taken are those sanctioned by the auditors. We have a sort of common purse, in which the money from each source is placed, so that if we have £20,000 in that purse, and want to spend £5000 of capital, we go to that purse and take it out without regard to the question whether the capital account at that moment stands at £20,000 or £5000. If we were compelled to keep two separate purses, our floating balance would have to be considerably increased. We should be compelled to keep a large sum of money ready for the exigency of capital which we might have borrowed from income, or we might be compelled to raise a large sum which, if the money was lying idle, we might use.

Mr. PATTISON: I observe in the statement you have handed in that in some of the blanks you have inserted the word "none."

Witness: It should have been all "none."

Serjeant SARGOOD: So far as the second column is concerned. In the fourth column we do not know the facts yet, so that you will not take that as applicable to the long blank.

Mr. PATTISON: The word "none" should have been inserted in all the blank spaces in the columns you have there. I observe that in this statement the London Company has a much smaller amount of floating capital than most of the other companies. In what matters do you consider the London placed at a disadvantage by having a smaller floating capital?

Witness: This was done late last night, and I really could not understand how the accounts of that company stood. I could not understand how they could work their business on such a small capital.

Mr. PATTISON: There is another company which also seems to work its business on a small capital—the Surrey Consumers.

Witness: I cannot tell. The only thing I can suppose is that they borrow largely of their bankers, and put in the balance-sheet, as not disclosed, the amount due to their bankers.

Mr. PATTISON: Would it not be possible that you could work with the small capital if you bought more largely upon credit—might not that be the explanation of the smaller floating capital.

Witness: Tradesmen like to have their money when it is due.

Serjeant SARGOOD: You have been asked to prepare a statement of the amount of increase in the rental for the years 1873 and 1874 in consequence of the charge for the gas supplied to the public lamps having been increased. In that statement you set out the fact that the increase in the charge for the public lamps took place from the 1st of July, 1873, and the addition to the rental of 1873, caused by such increase in price, amounted to £3981, a sum equal to 0·27d. per 1000 cubic feet of gas sold. Then you say that the addition to the rental of 1874 is estimated at £7906, equal to ·54d. on the quantity of gas estimated to be sold in that year.

Witness: Yes.

By the CHAIRMAN: Previous to June, 1873, we used to supply the public lamps at an average of 3s. 3d. per 1000 feet. When we found that our profits were not sufficiently large, we gave notice to the local authorities that we should increase that from July 1 to the current price which we charge all other consumers—viz., 3s. 9d. One or two parishes have given us notice to take the supply by meter from the 1st of April next. There will be a meter to every 12 lamps. The parishes will get a little advantage, I dare say.

The following statement, showing the capital expended on each station and the quantity of gas produced, was handed in:—

Statement of the Amount of Capital expended upon each of the Stations to the 31st of December, 1873; also of the Quantity of Gas produced at each Station during the Year 1873.

Station.	Capital Expended.	Quantity of Gas produced in 1873.	Capital per 1000.
	£	Cubic Feet.	s. d.
Pancras	353,639	1,116,789,000	6 4
Shoreditch . . .	319,029	1,159,532,000	5 6
Fulham	556,236	1,566,605,000	7 1
Bromley	661,614	16,408,000, commenced Dec. 15, 1873	..
	1,890,518	3,859,334,000	

Mr. CRIPPS: Surely you might have been able to have added Bromley?

Witness: No; that is obvious.

Serjeant SARGOOD: I have it £661,614; is there anything beyond that to add?

Witness: Not that I am aware of.

Mr. CRIPPS: There is nothing put opposite Bromley.

Serjeant SARGOOD: Why should there be, seeing that we only began it in December last?

Mr. CRIPPS: Do you mean that you had not a supply from Bromley at all before that time?

Serjeant SARGOOD: Never; we were driven into Bromley on account of not having room to do the purifying.

The CHAIRMAN: We understand that.

Examination resumed: Our Pancras station works out 6s. 4d. per 1000; Shoreditch, 5s. 6d.; and Fulham, 7s. 1d. I have not compared our capital with the results of other companies. I have prepared a statement showing the amount of capital raised by each of the metropolitan companies on the 31st of December, 1870, 1871, 1872, and 1873, except that with regard to the year 1873 I have only been able to insert the Imperial and the Chartered.

Statement of the Amount of Capital raised by each of the Metropolitan Gas Companies on the 31st of December of the Years 1870-71-72-73.

Name of Company.	Capital Raised. 1870.		1871.		1872.		1873.	
		Average per 1000.		Average per 1000.		Average per 1000.		Average per 1000.
	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Imperial . .	2,189,835	14 7	2,334,235	14 3	2,673,425	16 2	3,072,415	17 5
Chartered .	2,316,877	19 7	2,892,408	18 2	3,514,271	19 2	3,763,304	19 3
Commercial.	437,230	12 11	437,247	12 1	437,248	11 6		
Independent	235,792	10 5	244,000	10 2	248,300	10 10		
Ratcliff . .	115,670	15 0	115,670	13 9	115,670	13 0		
London . .	748,033	17 6	795,047	18 3	816,254	18 2		
Phœnix . .	943,296	18 6	959,388	17 11	971,000	17 9		
S. Metropltn	300,000	10 10	300,300	9 10	320,000	10 2		
Surry Consrs	264,260	16 3	264,707	15 2	275,649	14 11		
	7,550,993	16 1	8,342,702	15 7	9,372,017	16 5		

Examination continued: The Imperial, from 1870 to 1873, shows these two points: in 1870, they were 14s. 7d. per 1000; in 1873. 17s. 5d., with regard to the amount of capital raised. The Chartered, in 1873, showed 19s. 3d.; but that is less than they were in 1870 and more than they were in 1871, and rather more than in 1872. The Chartered Company, like ourselves, were building works of very great magnitude, and a large portion of capital there was unproductive, although it had been expended, and on which they were entitled to dividend. The average of all the companies for the year 1870 was 16s. 1d.; in 1871, 15s. 7d.; and in 1872, 16s. 5d. The present average, from want of material, I cannot give. The averages, as compared with ourselves, were that in 1870 we were 14s. 7d., as against an average of 16s. 1d.; in 1871, 14s. 3d., against 15s. 7d.; and in 1872 it was 16s. 2d., as against an average of 16s. 5d. We are still below an average of the whole.

By Mr. CRIPPS: The Chartered has gone down a little on the average; the Commercial has gone down; the Independent has a very trifling increase; the Ratcliff has gone down considerably; the London is an increase, but a slight one; the Phœnix has gone down, as have also the South Metropolitan and the Surrey Consumers.

By Serjeant SARGOOD: Supposing our works were finished, and all our capital expended which we wanted to expend, whatever that would represent per 1000 would be a sum that would go on continually decreasing as the quantity of gas we sold increased.

Mr. PATTISON: I observe the total amount of capital expended on the stations is £1,890,000, and that £2,764,000 is the amount of capital expenditure. Can you readily give the application of that difference? I presume the larger proportion will be in mains and services?

Witness: Yes. We have £713,487 invested in street mains, and £41,002 in service-pipes. As the mains are purchased they are carried to the investment account. We do not write off anything for depreciation. The amount of capital for mains goes on increasing from year to year. I should very much like to have a depreciation-fund, but we have not got to it yet; we ought to have it. The mains we now possess are certainly not worth the amount standing in our books. If we had written off depreciation we should have to charge that to revenue, and therefore increase the price of gas. Before we had our fixed dividends we did write off about £180,000 for depreciation. All replacements of mains are charged to revenue. If we take up a 6-inch main and lay down a 12-inch, part of that goes to revenue, and the increased value to capital. We have had no competition since 1857, since which date our dividend has been practically protected. The amount of capital standing to the debit of the mains and services in December, 1857, was £463,611.

Mr. PATTISON: I want to know the amount of capital expended on mains or standing to the debit of mains at that date. I want to know also the capital now expended in mains and the extent of the mains at this date. I want to know what difference there has been in your system of writing off capital prior to that date and since. I then want to know what was the value of the mains at the date when the competition ceased. You were saying that a sufficient amount was not written off for depreciation. I want to get at the amount of the expended or exhausted capital that was taken over when the competition terminated. If the mains stood in the books at £500,000 and they were worth only £300,000, £200,000 for depreciation had not been written off; a fixed dividend was being paid on £200,000 of exhausted capital. I want to know whether that was the case or not. The statements which I have asked you to get out, and upon which some other evidence may be necessary, would bring out those points, whether you have in the company adopted the true system of depreciation, whether you have from time to time really written off all that you have written off.

Serjeant SARGOOD: Allow me to make a suggestion upon that, because I quite follow what you intend, but I must ask you to remember, as a lawyer would, that we are not in the position of an independent trader who can make his capital more or less at his own option, according to what he thinks it is worth. Our capital means the sum subscribed by our shareholders, whatever may have become of it, and the amount of which we have no power to regulate by the value of what it has produced, and must always remain intact.

Mr. CRIPPS: Do not suppose that I assent to that.

Mr. PATTISON: It may be that you should have written off three years ago a certain amount of your capital; you should then have applied for revision, and have got an increased price.

Serjeant SARGOOD: Excuse me for saying that that idea for writing off capital—that is to say, reducing its nominal amount, because the thing it represents has been reduced in value—is a thing which is impossible under a statutory formed company; you cannot do that. The chairman will tell you that you cannot treat this in a strictly commercial point of view, as though we were a mere joint-stock trading company.

Mr. PATTISON: Would the Act of Parliament preclude you from writing off capital account?

Serjeant SARGOOD: Let me ask you to put yourself in the place of a shareholder, and just imagine what would be the effect on yourself. You have a £100 share, representing so much capital, that has been invested in a main that years and years ago has been worn out, and has been replaced by a new one, that you as a shareholder subscribed to pay for. No one would tell you that because the old pipe was gone your capital was gone, and you no longer have a dividend. It is not like the capital of a trading company and a city merchant, who has to deal with value; you deal with this thing as a thing which lasts for all eternity, or, at all events, as long as the company lasts. There is no power to reduce it; we have no power to deal with it in that way.

By the CHAIRMAN: I do not think it is possible to ascertain the value of our mains at a certain date, because our mains will go all together. The value of our mains is the profit they return to us.

By Mr. PATTISON: I remember being in the committee-room of the House

of Commons when the company asked to be allowed a depreciation-fund; it was then refused.

Mr. PATTISON: If you were not allowed a separate fund you were allowed to write down, in the year's account of the revenue, wear and tear?

Witness: We charge that wear and tear, replacement, and all repairs of buildings, to revenue. I should very much like to be able to charge to the revenue an amount for depreciation every year, but I do not think our official auditor would pass it.

Serjeant SARGOOD: I may add to what I have said about reducing capital, you may bear in mind the converse proposition. Supposing the land we bought the other day at so much an acre was valued now as being worth so much by reason of the contingency of the station, we could not increase the value of our capital because the land was worth more.

Mr. CRIPPS: The value of your land may be varying year by year.

Serjeant SARGOOD: A merchant would increase the value of his capital by the value of his stock-in-trade necessarily. If the market changed, and it was worth more this year than last, it would be estimated at the market price. We estimate it at the cost, and have never charged the figure.

Mr. CRIPPS: So long as you divide 10 per cent. it is dividing more in some years than you are entitled to divide.

Witness: As far as the charges to our investment account stand, the official auditor examines it every year, and he signs the book.

Mr. *Kirkham* recalled, and cross-examined by Mr. CRIPPS.

The sum of £593,000 has been expended at Bromley. In applying for an Act of Parliament, a general amount is given to carry on for a certain number of years, and Parliament trusts not to the plans that are put in at the time, but to the discretion and management of the company for wanting that money and spending it during those years. We really do not know ourselves from year to year what we require. The amount we asked Parliament for was estimated to carry us on for ten yoars. The sum actually expended at Bromley up to the end of last year is £662,491, including land.

Mr. CRIPPS: Do you assent to the proposition that with the increase of capital expended, and now just coming into a state of productiveness, the increase on your make of gas next year is only to be a little over 1 per cent.?

Witness: 1½ per cent.

Mr. CRIPPS: That increase of capital, so far as the account goes, and, supposing nothing more is spent on it, will produce 1½ per cent.

Serjeant SARGOOD: He did not say that.

Witness: No.

Mr. CRIPPS: Your total increase at Bromley alone of capital now becoming productive is £662,000, and your increase in the next year you estimate at 1½ per cent.

Witness: I do not estimate it at that.

Mr. CRIPPS: You know that is the estimate given?

Witness: As far as the pounds, shillings, and pence go; but not as to the manufacture, the increase of which will ultimately be indicated by the increased receipts to a great extent. During the 10 years previous to the commencement of the construction of our works at Bromley, our increase was 101 per cent.—that is 10 per cent. taking it on the average. Some years we had 15 per cent. increase, and the next year it would perhaps be only 3 per cent. It was that large increase that led us to begin at Bromley as early as we did, in anticipation that that increase would at least continue, and probably might be increased by our increased manufacture there.

Mr. CRIPPS: Setting aside for a moment any disturbing causes, should you anticipate that your increased sale in 1874 would be 10 per cent., at least, over what it is now?

Witness: I take it at 8 per cent. We usually average 8 per cent. as our increase, and we find that works out.

Mr. CRIPPS: You do not attribute anything in the increase of 1874 over 1873 more than 1873 would be over 1872, or 1872 over 1871, in consequence of the large outlay at Bromley?

Witness: Our increase of gas will be the same, or thereabouts; year by year it will be the same.

Mr. CRIPPS: The increased sale will go on in the same ratio as it would if you had not made the works at Bromley at all—8 per cent.?

Witness: Yes. You must remember that Bromley has the whole of the work to do. We start at Bromley with a make of 21 millions—that is our present make—and all the increase will have to be carried out at Bromley.

Cross-examination continued: I know the price of coal, but I have nothing to do with the buying or selling of coal at all. I could not tell you the price we should contract for at the present time. We have had no contracts entered into very recently. I have gone into the question of purification in detail, and I have the actual cost of purification by the use of lime in October, November, and December. The cost at Fulham station, where we are exclusively using lime, was an average of 1s. 4½d. per ton; we have not had an opportunity of trying it at our other two stations thoroughly.

Mr. CRIPPS: Is this the lime process put against the oxide—the cost of the two methods of purifying?

Witness: This is only the lime. We are obliged to use a portion of oxide. We use that with the lime, not separate. As an engineer, I have gone into the matter to see whether what has actually been done has been done in the most economical and proper way. I have not merely taken the figures. I have the cost here of the lime process in the three following months.

Mr. CRIPPS: What do you compare that against, in order to show the increased price which will result?

Witness: We should compare this with our ordinary purification by oxide, but I have not the figures here.

Mr. CRIPPS: I see you have here the total cost. From that you would have to deduct the cost of the other process?

Witness: You would have to compare it with the cost of the other, to see what the difference is. The other was 9½ per ton—that was given in yesterday.

Mr. CRIPPS: A mere statement of account in Mr. Field's book would not go quite as far as I should desire from you. As to this part, the line is not only a statement from the book, but a statement from your knowledge of the proper mode of doing it?

Witness: Yes; so is the other. These accounts are kept week by week—the money paid for them. I am conversant with the sale of residual products, and also the sale of coke. We sell 42 bushels of coke to the chaldron. I believe that is a peculiar custom of our own. I am not certain whether any other company does it to that extent. It renders it difficult to make a comparison with other companies about cost; but the other companies, as far as I know, sell 36 bushels. We have had, at Bromley, to increase considerably the expense in putting a quantity of materials on the marsh ground to raise the land an average of 12 feet. That has been done to about 25 or 30 acres, at a cost of £300 or £400 per acre.

Mr. CRIPPS: Done as that is there now, in the contemplation of what make per day has that been done, or what make per day would render it necessary for you to have prepared that 25 acres in that way?

Witness: We are commencing with 7 millions make at the present time. That is the greatest make on one day. The 25 acres would do for 10 millions, perhaps. Of course, we shall go on filling up that land as we want it. In the retort-houses we have a travelling-stage and the ordinary floor level, which is raised 12 feet. In this case, we build up, and fill round the building.

Mr. CRIPPS: How much extra wall do you have to build to carry on that staging over what you should have if it was on the ground?

Witness: We have gone up about five feet—the height of the travelling stage. Part of the coke falls from that floor to the pit below. From the top retort is about 16 feet to the bottom of the vault below. All the coke falls that we do not use for fuel.

Re-examined by Serjeant SARGOOD: In 1869 we contemplated that within three years we should expend a given sum; but it has been thought prudent to expend more than we originally contemplated, circumstances having arisen which rendered it necessary to do so. The River Lee Commissioners have compelled us to spend a large sum of money in reference to the work on each side of the bridge, which was a thing not contemplated in 1869. Bridges and approaches are contemplated, but the banking up of the river for the protection of their property is a thing they have put on us since. With regard to the discretion for spending what has been done on the works, of course the directors spend the money on what is set forth by the engineer as required for certain works; but as to whether, when the engineers have said that certain works are necessary, the directors choose to adopt their views and spend the money on them is a matter within their own breast. In my judgment, there has not been anything laid out up to this moment on the works that was not advisedly laid out, having regard to our present as well as our future wants.

Serjeant SARGOOD: My learned friend has been examining you with regard to the increase of sale, as to the per centage per annum, and you rather hastily adopted the idea of increasing the per centage in ten years. I want you to look more carefully at this book which I borrowed from you for the purpose; look at 1860, and then at 1873, and you will find you have exactly double quantities there—that it took just 13 years to double it?

Witness: In 1860 it is 1981 million, and in 1873, 3856 million.

Serjeant SARGOOD: It is not double in the 13 years. Now, instead of it being at 8 per cent. per annum, allowing for the increase on the increase, that would work out 5½ per cent.

The CHAIRMAN: How do you mean increase on the increase?

Serjeant SARGOOD: In this way; supposing we add 8 per cent. this year to our consumption of last, and then add 8 per cent. next year, it is 8 per cent. on last year and 8 per cent. on the increase of this year, so that it is a species of compound interest, and it will not do to divide it by the number of years, and say that is the normal rate of increase per year.

Mr. CRIPPS: It is quite a mistake of yours, as between the two years—the one ten years ago and the one last year—there has been a certain amount of increase divided by that number of years, which is the correct amount.

The CHAIRMAN: The average of the past ten years will be a guide to the average of the next ten years.

Mr. BIDDER: No.

Serjeant SARGOOD: Not to the average of the annual progress; it will still be only for the next year, 5½ per cent. on this year's consumption. The question is what is the annual increase; you cannot divide it by the number of years, because you are dealing with compound interest.

Re-examination resumed: We had not the means of carrying out the new system of purification at any other station than Fulham. The gas referees having fixed the maximum of the amount of impurity they would allow, our experiments were carried out with a view to find out whether it was possible to attain that purity, and next to see what the change in the system would cost.

Serjeant SARGOOD: You are asked as to the cost under the oxide of iron working antecedently. There are some figures that show exactly what it was at Fulham—the place in question—which I am told comes out 6s. 1d. What is the cost of it?

Witness: That is including material and wages. The 16s. 5d. also includes material and wages; so that the difference between the two systems, according to the Fulham experience, is 10s. 4d.

Re-examination continued: Before the land was raised it laid below the water level. It was essential for the protection of the property and the permanent security of the works, that we should raise the level where we were going to build the works. We had to build a wall to keep the tide out. The large dock we had to make afforded a small proportion of the materials for raising that level. We gave people liberty to shoot rubbish gratuitously, so as to avail ourselves of all the means we could. We had to pay for some of the material and for all the unloading. In my judgment it was a necessary, proper, and judicious outlay. Our works are now making about 1½ million, but they are capable of making, as far as they are at present finished 2½ millions. When we have completed the works now in progress, they will be capable of making 10 millions. The works are capable of being sufficiently extended to increase the manufacture to 20 millions as required. The bridges and all those things are for all time, but they must be made at starting. I do not think the works have been begun a day too soon; rather the other way.

Serjeant SARGOOD: Supposing they had delayed commencing these works and raising their capital, do you think they could have made them at a cheaper rate than they have?

Witness: No; it would have cost us over 40 per cent. more to erect the same amount of works that we have now there, taking the price of labour and materials. That means over £100,000.

Mr. CRIPPS: The cost of the purification by lime is rendered very great by the objection people have to the nuisance created by it.

Witness: Yes; there is some amount of nuisance.

Mr. CRIPPS: Then, when you had to do that at Fulham, in the midst of the population there, you had to do it with great care, so as to produce no nuisance?

Witness: Yes.

Mr. CRIPPS: That would not be to the same extent when you have to do it at Bromley?

Witness: I am not certain. There is a large population at Bromley, not different from the population at Fulham, taking the immediate neighbourhood of the works.

By Serjeant SARGOOD: We shall have to be just as careful at Bromley as at Fulham. There is a neighbourhood capable of being annoyed by the nuisance, and you must take care to protect them against it. With regard to the Chartered works at Bow, I know there are great complaints, notwithstanding all their care, and notwithstanding it is a very much less populated neighbourhood and a much less wealthy one.

Dr. ODLING: Let me call your attention to these figures in Mr. Field's book. I find that in 1869 the expense of purifying per ton of coal was 3·93d., in the next year 4·5d., in the next 4·3d., and then 4·2d., and in the next year it jumps up to 8·8d. Do those sums include all the other items which are included in the 17½d. as purification by lime, and in the 6d. which is here given as purification by oxide?

Witness: As far as the labour and materials go, yes.

Mr. BIDDER: Are you sure you are right in that, because I am told by Mr. Field that that is simply the material, and not the labour.

Dr. ODLING: I find that in the evidence given by Mr. Evans on the occasion of the inquiry into the Chartered Company, he says that at the present time the cost of purification by the use of oxide is 1½d. per ton of coal.

Witness: That is the cost of material alone.

Dr. ODLING: Is that 1½d. the figure which corresponds to the 3·93d., and the 4·5d., and the 4·3d., and the 4·2d., in these tables of Mr. Field's, as the expense of materials used in the purifying?

Mr. BIDDER: It is better that Mr. Field should answer that question.

Mr. *Field* recalled, and examined by Dr. ODLING.

Dr. ODLING: Serjeant Sargood told us the price of purification by oxide was 6d. per ton of coal, and your tables give it at about—excepting last year—4d., and you say that the difference is that Serjeant Sargood includes labour in purifying and your figures do not.

Witness: My figures also include oil, sundries, and other things.

Dr. ODLING: We find that Mr. Evans, when he was asked last year what is the expense of purifying by oxide, says 1½d. per ton of coal.

Witness: That is merely the material for purifying—oxide.

Dr. ODLING: The sundries amount to about double the material used in purifying?

Witness: The sundries amount to 1·8d.

Dr. ODLING: That 1·8d. must be subtracted from that, which would bring it to an average of 3d. on your statement and 1½d. on Mr. Evans's?

Witness: Yes.

Dr. ODLING: Do these sundries relate entirely to the purifying?

Witness: No; they exclude it. The sundries consist of gloves, leather, birch brooms, stokers clogs, dress baskets, sacks for coal, coke, and breeze, cartage, and petty cash. They are all materials used in the manufacture; this is the parliamentary form.

Mr. *Kirkham* recalled, and examined by Dr. ODLING.

Dr. ODLING: It leaves it on the evidence that what would cost you 6d. to do by iron costs you 17½d. to do by means of lime?

Witness: That is so. In this joint treatment the lime is used only once, and the oxide several times. In estimating the cost of the oxide, I take the average of the year what the oxide has cost us. If we purify at our new works at Bromley by means of lime, we should fill up the land with the spent lime as far as we could. At present we have to barge away all the spent lime from the other three stations. In 1872 there were no restrictions upon us in respect to sulphur, but throughout 1873 we were under different restrictions at different parts of the year. In March we had notice from the referees that the maximum should be 25 grains. That was from March to September, and from September to March we were up to 30. At Bromley we have five blocks of buildings laid out, each of which will be capable of producing, when finished, 5 millions. Of those only one is begun, and as to that we have only one retort-house instead of two. At our old works at Fulham, Pancras, and Shoreditch we were working up to the maximum which they were capable of producing. There is a disadvantage in respect of the price at which the gas is made in working them that way. If we diminish our manufacture at those stations and increase it at our new station, we shall work more economically as respects the cost of production, but less economically in respect of the gas per capital.

By Serjeant SARGOOD: We have to make a coke trade at Bromley. It will reduce our average price of coke for a time till we have got a good trade there, no doubt.

By Dr. ODLING: Long before the introduction of iron I had experience in the use of lime for gas purification.

Dr. ODLING: So that it may be taken that your experience within these last three months will be likely to be improved on till you get more accustomed to the use of lime.

Witness: Slightly; not to a great extent.

By Mr. PATTISON: I can hardly say what is the estimated quantity of gas we shall produce at Bromley in 1874; it depends upon how soon we can get our works ready. We shall want the 7 millions at Christmas time. We have no supply in the neighbourhood of Bromley; the works are merely to supply our other districts. The main that we have laid we have no light on for five miles. We were driven out there so far as the manufacture goes.

The CHAIRMAN: With regard to the works which you said were put on you by the Lea Conservancy Board, what were those works?

Witness: Protecting the foreshore and the bank. The tide of the river Lea is some 12 feet at high tide above the marsh level, and for the protection of the banks when doing the bridge they made us put a wall right and left of the bridge, to protect the works. They have power over the foreshore, and they would not let us execute the works unless we undertook to do certain things for the protection of their property. They also made us pay £500 for part of the foreshore. Those works were not taken into account in the estimates that were laid before Parliament.

Mr. *Harry Chubb*, examined by Mr. BIDDER.

I have been secretary of the Imperial Gas Company for some years, and am well acquainted with the general management and affairs of the company. I am acquainted with the new works that have been carried out, and the manner generally in which capital has been expended since 1869. The expenditure has been undertaken after the most careful inquiry on the part of the directors; and, investigating every circumstance, and taking everything into consideration, they have bestowed the greatest attention and care on the subject.

Mr. BIDDER: Are you satisfied, generally speaking, that it is an expenditure that will prove abundantly remunerative in the long run?

Witness: It is at present in a state of transition. The land, of course, is more than is needed for our present wants; but, upon investigation, it was found desirable to purchase that which would be required for the future. We are now making only a limited quantity of gas, and the additional demands do not require absolutely those dimensions at present; but in the end I am satisfied that the expenditure will prove to be economical. When the whole of the make which the land and works are capable of producing, when finally completed, is put against the cubic feet, the rate of capital in the end will be very small. The laying out our money in such a way as will provide gradually for the increasing wants of future years has been the thing most carefully kept in view throughout the whole expenditure. I have all the contracts existing which run into the year 1874. With regard to the manner in which the estimate for coal of £542,757 is made up, the larger portion is derived from actual existing contracts. We had in hand at our stores at the end of 1873, 38,178 tons, which cost us £53,782. We have already contracted for 194,175 tons, which will cost us at the contract price £260,077. We have yet to obtain 183,810 tons, and that is estimated to cost us £211,880. The contracts were most certainly entered into prudently. Tenders were not invited for the whole of the coals, because the early part of last year was an exception to the rule, and in that case it was not so done. In the early part of 1873 the coal panic commenced, and the directors were warned of the possible difficulty as to their being able to secure the coal that was absolutely needed. It was pleaded that the collieries were really not producing anything like the quantity of coal which several pits had previously produced; that there was so small a get, and so large a demand, that the company might be in a position of not being able to procure the coal they absolutely required to obtain to make the gas, and the directors applied to two of their largest contractors who had been supplying them with coal for many years, and who were men of high character, with a view of seeing in what manner they had better proceed, and both of those gentlemen declined to make contracts for the quantities they had hitherto made with us. They reduced them very materially. They said they would arrange with the company for a limited supply, although they felt great difficulty in being able to make a contract at all, and the directors arranged with these two on shorter terms. There are existing contracts to the extent of 50,000 tons in one case and 30,000 tons in another unfulfilled, and those quantities were merged into new contracts for increased quantities, and at an average price, and that average price the past year 1873 has had the benefit of. Then the directors having done that, and having secured to the extent of 200,000 tons towards last year, waited to see what might be the result of the coal market, and whether they ought not to do better as time went on, and trusting that time gave them the advantage of 3s. or 4s. a ton in the price of the coal on the remaining quantity to be obtained. In my estimate for the coal which is not contracted for, amounting to 183,810 tons, I take Newcastle coal at 21s. 8d. a ton, as against 26s. 2d., which is the price at which it has been actually contracted for. That amount has been put down after a very extensive inquiry, and represents a price of 14s. 6d., free on board, at the Tyne or at Sunderland. It is a drop of 5s. 6d. as compared with last year. To the 14s. 6d. I add freight 6s., including despatch; City dues, 1s. 1d.; and metage, 1d.; making, with the price at the wharf, 21s. 8d. That is the cost in the river Thames. Besides this there are certain charges for lighterage to the different works, which I have included in the item of "Lighterage and canal dues." I have arrived at the estimated figure for the cannel coal, 42s., in the same way—by making inquiries wherever it was possible to get any information to guide us. Of course, both the items are speculative. I am afraid the cannel is set down too low, and it is doubtful whether we can get the Newcastle coal at the price set down; they are both speculative prices, but ascertained with the greatest care, and really with the view of not putting down one halfpenny more than was thought absolutely necessary. The item on the other side of the account of "Income from the sale of coke and other residual products," is an exceedingly speculative price. We do not sell our coke to any great extent by contract. It is at the Fulham works only that we have contracts of any magnitude. Those works are in a large district, and the neighbourhood round it is sufficiently large to take the coke, but we are obliged to sell to the cement burners on the river a certain amount. At other stations we have no contracts, and we fix the price from day to day, according to the demand. The price must fluctuate with the current price of coal; and it will also depend in a great measure whether the market exceeds the demand. We have no room to store; we are obliged to sell at whatever price it may be from day to day, and if the price be exceedingly low we are obliged to take it, because the works must be kept clear—the cellars for the men to work in must be kept free; so that, in settling what the price may be for this year, it is a very difficult thing to arrive at. We have one contract with the Walham Brick Company of 35,000 chaldrons, which was a most fortunate one. The figure I work out as the price in the estimate of 1874 is 1·43s. per 1000 feet of gas. I am afraid that is more than we shall be able generally to realize. It works out, in fact, 12s. 2d. per chaldron, and that is a price, I am afraid, since these tables have been made out, we have very little hope of obtaining. At the time the table was made the Chartered Company had a running contract for all the Beckton coke for 18s. throughout, and this year, or up to a late period of last year, the contract has utterly failed, and that coke which was to be taken at 18s. is now thrown upon the market, and it has depreciated the price of coke generally, because it is a very large sum to be thrown upon the market, and I am afraid that the sum we have set down here is hopelessly unattainable. The 12s. 2d. is the net price, after allowing for the cost of unloading; therefore we must obtain 15s., in fact, to realize the 12s. 2d. to compare it properly. With regard to the matter referred to in the correspondence with the River Lea Commissioners, it is a very peculiar affair. The company were bound to make their works at West Ham fronting the river Lea or Bow Creek—both under the control of the Lea Conservancy—to the entire satisfaction of the Conservancy, and when we came to make our entrance to the dock at Bow Creek they claimed the foreshore of the river, and after a great deal of inquiry it seemed as if they were entitled to it. We had no parliamentary power to compel them to sell, and we were subject to exactions from them. Perhaps it is a hard word to use, but they demanded £1000 in the first instance for the privilege of cutting through the river Lea and for the works in connexion with it, although they reduced that subsequently upon appeals. We were advised that we were entirely in their hands, and had to do just what they required of us; that led to some very expensive works, and the compensation I have referred to. We had to make a dwarf wall all the length of the entrance to the dock, which cost a very large sum of money. The land was very treacherous; having been the foreshore of the river, it was all mud. Then on each side of the bridge they required us to make a wharf, with a view of keeping barges from the bridge, and also for their own protection. We have altogether 150 acres of land. We let a portion of it, and we have not yet paid for a portion of it, thinking it would come in from time to time as the building required it; and we thought we had better let the payment wait till it was actually wanted, so as to economize to the utmost extent. We must complete our purchase of land in eight years. We have gasholder-room at present for 4 million cubic feet.

Mr. BIDDER: Mr. Clarke's figures, in 1860, provided for 1,600,000, so that you have made works for a larger quantity of gas?

Witness: I may say that the whole of those estimates have been revised. The directors, simply because they had been given in that way, did not adhere to them. They were left to their own judgment; they considered they were responsible for the outlay, and the question was altogether gone into *de novo*, to see what was best to be done, and if any alterations were absolutely needed they were made. The works contemplated in the evidence for the Act have been carried out in their integrity, although revised in detail; there has been more spent there and less spent here, and the thing remodelled upon the whole as it was thought best. Since 1869 the purification question has been a very serious matter, and has led to more alteration, perhaps, than anything else. It has led to our hurrying on with the works at Bromley considerably beyond what was intended; we were driven from our other works to Bromley, and that increased the purifying space far beyond our original intention. The purifying apparatus at the existing works was wholly insufficient for the new mode of purifying; and upon inquiry whether we could possibly increase the purifying space and the plant at the existing works, it was found to be impossible, unless we pulled down a retort-house at one place and some other works at another, which naturally would reduce our make of gas; and rather than do that, and sacrifice some vested capital, the company have gone to Bromley, and have increased the plant there, so as to make them sufficient for the purpose, so that it has reduced our make of gas at our existing works considerably. The result is that it makes it more expensive on the capital expenditure to provide for the purification.

Cross-examined by Mr. CRIPPS: When the directors obtained their Act they were bound to remodel the estimate laid before Parliament if they found it was in any degree ruinous, or if in any degree it did not fulfil the purposes for which it was required.

Mr. CRIPPS: What was the object of handing in that estimate to the committee?

Witness: I cannot recollect the circumstances that called forth that estimate. It was not an estimate for the outlay at Bromley, it was only an estimate for the immediate want of 2 million feet of gas per day.

Mr. BIDDER: It would be better to read it. It says, "within the next three years," "the estimated outlay of capital which will be necessary for the erection of works capable of supplying 2 million feet of gas per day at West Ham Marshes."

Mr. CRIPPS (to witness): That is what you contemplated at the time, and told Parliament you were going for, and you got your bill upon that statement?

Witness: It could not be the entire question, because there was the question of the capital, £1,300,000.

Mr. CRIPPS: The actual expenditure of the large sum you obtained was a

matter for the care and management of the directors of the company—it was left entirely to them?

Witness: It depended to a great extent upon them; they were bound by circumstances.

Mr. CRIPPS: Is not this the ordinary thing. You say you consider what your liabilities will be and what you will want for so many years to come, and Parliament entrusts that sum to the company to lay out upon those terms.

Witness: I suppose that would be in general terms the course of business. I think the directors would feel bound to adhere in a general way to the evidence they have given, and the conditions Parliament has imposed upon them. They felt bound to build the bridge and make the bank and to get that land; all the leading points they were compelled to carry out, but in matters of detail and altered circumstances, I think Parliament may have left them some exercise of judgment, and they have carried out in their integrity the works then stated to Parliament to be absolutely required.

Mr. CRIPPS: That is to say, having stated that they required to lay out £250,000, they have so far carried it out that they have laid out £650,000.

Witness: They have gone in advance no doubt. Circumstances have altered, and compelled the directors to vary and expend more than they would have done.

Cross-examination continued: The capital we obtained power to raise in 1869 was as nearly as possible equal to our then existing share capital. Parliamant gave us power to raise that capital either by a 7 per cent. ordinary stock, or a 6 per cent. preference stock. The entire amount has been created as 7 per cent. stock, but it has not all been raised. We never took any steps to raise the amount by a 6 per cent. preference stock. I am not certain that it would have been a loss to the shareholders to have done so. The old shareholders, of course, would be at a disadvantage, if a large amount of preference capital was created, even though it were at 6 per cent., which would command a very high price in the market; and as a matter of premium, the question is whether it would not obtain a higher premium than the 7 per cent. ordinary stock. I believe the London Gas Company has a 6 per cent. preference stock, but I do not know of any other company which has such a stock. No doubt that 6 per cent. of the London Company bears a premium, and always has.

Mr. CRIPPS: Therefore there is no difficulty, in the gas world, for gas capital to be raised at 6 per cent.

Witness: At certain times there is not. I may say that when we first issued our 7 per cent. stock a very small portion of it could be placed at the first moment; we had the greatest difficulty in placing the stock, and it was some time afterwards before it was all subscribed for.

Mr. CRIPPS: That can only arise from a want of confidence in the company. Your preference stock would, at any rate, be at as good a price in the market as the London preference stock. In other words, a preference stock of 6 per cent. could have been floated?

Witness: Yes; and so far it would have been a greater boon in the early times. The consumers would have paid so much less between the 6 per cent. and the 7 per cent. We issued some of our 7 per cent. stock last December, and that brought a premium.

Serjeant SARGOOD: Part of the premium was written off capital.

Cross-examination continued: If the shareholders raise capital, it would be to their benefit, no doubt—that is, if they held amongst themselves a certain number of shares.

Mr. CRIPPS: Do not suppose I am putting the question offensively with reference to the management of the company, but, ordinarily speaking, it would be to the interest of the shareholders to get as much called up, when the 7 per cent. is once created, as they can float, and therefore to spend the money as fast as they can?

Witness: In answer to that, it implies that it is possible it may have been done by the shareholders. Now, the shareholders themselves are not the originators of this creation of the capital; it originates with the board. The board have watched thoroughly the abstract requirements of the company, and their assets, and the originating of this capital has been with them, and not with the shareholders.

Mr. CRIPPS: The board are the representatives of the shareholders; the consumers, on the other hand, who pay more in proportion to what is called up, have nothing to do with the matter?

Witness: They have not. I may tell you the feeling among the directors, and what guides them upon the matter, is that the lower they can sell the gas the greater benefit will result to the company. They feel they are never safe so long as they are not selling as cheaply as other people, and at the lowest possible point at which they can make it, and that guides them throughout the whole affair. If they raise more capital it increases the cost of the gas, and it is kept in view that the property is risked more the higher the price of gas is.

Mr. CRIPPS: Do not suppose that I am imputing any corruption to the directors of the Imperial Gas Company.

Serjeant SARGOOD said there was only one broad line of demarcation—either it was done with due care and honestly, or it was a fraud—and if his friend imputed that it had not been done with care, then it must be taken as an imputation of fraud.

The CHAIRMAN said the directors had a statutory option, and they had exercised it. It was only a question whether it had been judiciously done.

Mr. CRIPPS: Assuming the operation of the Act of Parliament to be what is suggested on the other side, it cannot affect the shareholder, because he is to get his 10 or 7 per cent.; but there is no other protection which a consumer can look to except the full operation given to those words, "due care and management."

Witness: I presume that is so.

Cross-examination continued: The total amount of common coal we require for the year is 400,000 tons in round numbers. The estimate of 21s. 8d. is not the gross price, but is exclusive of the conveyance from the ship to our works. At Bromley the delivery would cost about 3d., and at Fulham 6d.; but there are canal dues of 1d., I think, at the Kensington Canal. The lighterage at Fulham has been done for many years by contract.

Mr. CRIPPS: With reference to the floating capital we have heard of, what was the floating capital of your company, say in 1867?

Witness: I am afraid I have not got it. I thought Mr. Field would have been a better person to answer the question.

Mr. CRIPPS: Mr. Field takes floating capital, whether it has been called for the purpose of being spent in particular works or whether it is not, as due, if you want the surplus, to the carrying on the trade, or in one lump.

Serjeant SARGOOD: Floating capital has only one meaning. It means so much of the capital paid up, though not yet expended.

Mr. CRIPPS: I cannot take it in that way. Supposing you had no Act of Parliament at all under which you were enabled to make calls, and supposing you had no works going on at Bromley or elsewhere, in respect of which you would call up capital, what would be the floating capital which you would require to carry on your business?

Witness: You are asking me questions which will require a great deal of explanation. You are supposing a state of things which cannot exist.

Mr. CRIPPS: I am supposing a trader carrying on his business, not having a capital account open by which he is able to create a capital.

Serjeant SARGOOD objected to the question, as the witness was being asked how a trader under certain circumstances would act, and he was not a trader.

Cross-examination resumed: If you are asking me if we had no capital what we should do, I cannot tell you; we should be in fix, it seems to me. We are raising every year a certain amount of revenue, and we are bound to spend it. I believe this last year we could not have done with less than the £300,000 that we have had—which is the floating capital—for the purposes of the company. It would more correctly define it in this way. We have a certain income which has to be spent. First it has to pay the shareholders, next to make up the reserve-fund; and any surplus whatever must go in reduction of the price of gas.

Serjeant SARGOOD: No; it would go to the next year's revenue under the new Act.

Witness: It would be carried over, but in the end ultimately it must go in reduction of price.

Cross-examination resumed: My company would carry over no sum, expecting the Metropolitan Board would apply to the commissioners for a reduction of price. My reading of the matter is that we have no business to carry over a sum for carrying on our business out of our revenue, and therefore availing ourselves of capital called up under a particular Act of Parliament is the only means open to us for the purpose.

Mr. CRIPPS: Have you any idea what amount of floating capital would be required, according to the trade in gas?

Witness: I have been asking several companies this morning upon the subject, and they all tell me, so far as they can see, one-seventh of their capital, under present circumstances, seems to be required for floating capital. I have really been unable to form an opinion on the matter. I see it is altered by circumstances which have happened, such as the rise in the price of coal. I think I ought to explain what that floating capital means. At the beginning of the quarter—say Jan. 1—we have delivered to the consumers all the gas that we have made during the past quarter, and we have to obtain the money from them. We have paid all the expenses out before we can receive back the money, which is a very large sum indeed, and we are out of pocket all that money. Then, again, we have to keep in store in the winter time an enormous stock, especially in troublesome times such as these in the coal trade, where the miners could not be relied on to work and freights uncertain; and there are other stores of great magnitude which we have to keep in hand, so as not to be dependent on them day by day, to see that we are in an independent position and able to supply the public; because, if we were unable to supply the public with gas, we should be in a very serious position. All that amounts to a very large sum, and although the amount of £300,000 seems to be very large, it appears from the circumstances not to have been too large.

Mr. CRIPPS: You are aware that in the accounts kept under the Act o Parliament this £300,000, or whatever the amount is, is set out under capital, and has nothing to do with revenue. Do you consider that the consumers paying for the gas are to pay so as to keep up a 10 per cent. dividend on all the capital you may keep as floating?

Witness: You said 10 per cent., and it may be also borrowed money at 4½ or 4¾ per cent. We have raised money by debentures, under the Act of 1869. The Act says that when a certain amount of the capital is subscribed and paid up, then we may borrow money; and that has been done each time.

Mr. CRIPPS: Upon debenture, in 1871, 1872, and 1873, you give a certain amount raised. These are the whole amounts raised for debentures, whether under the Act of 1869 or any preceding Act, I suppose, out of which I get an amount paid off which, in the same way, would be paid off out of money received under any Act, reducing the total amount upon the debenture debt created in these three years; and upon this question of borrowed capital it applies only since 1869 to the sum of £12,000.

Serjeant SARGOOD: The £12,000 is only the increase of the debentures.

Cross-examination resumed: With reference to the anticipated income from the increased amount of gas sold, I certainly assent to Mr. Field's proposition that it will be only 1½ per cent., as I consider the increase of price will check consumption.

Mr. CRIPPS: In other words, the outlay of £660,000, in connexion with this Act of Parliament, will be a means of lessening the amount of the supply to the public of London?

Witness: What limits the increase is not the expenditure of the capital, but the increase in the price of gas, resulting from various circumstances.

Mr. CRIPPS: But one of the material circumstences is the increase of capital?

Witness: It is partly so; but the large items are certainly the increase in the price of coal, the depreciation in the price of coke, and the making up of the reserve-fund, which has been drawn upon very severely during the past year. In giving my opinion that the increase will be only 1½ per cent. more, it is upon the assumption that the consumer will pay himself back. He is master of the position as to the consumption, and he will burn less, and so he repays himself. With regard to the supply of coal, when the directors find a coal which they like they ask for a fresh tender; but when they find the coal-owners are not so reasonable as they think they ought to be, they invite tenders publicly or by advertisement. The acceptance of those tenders would certainly not be left with me. The board have the whole details before them, and take their own advice, together with what I can give them as well. There is no colliery owner on the board, who are thoroughly independent of the coal trade. The board, with one or two exceptions, consists of gentlemen who have been there for years. Their own opinions and thoughts are thrown into the question, and they exercise their discretion. They take the advice of their agents on the Coal Exchange—Messrs. Hillwood & Co. We do not buy coal there. They act as our agents in receiving all the ships, and conducting all the business, and giving us special information upon the subject.

Mr. CRIPPS: When your shares are created, and not taken up by the shareholders, what course do you take for the purpose of disposing of them?

Witness: Some broker upon the Stock Exchange is selected to sell them at the highest he can obtain in the market, and then the amount is applied as I have mentioned.

Re-examined by Mr. BIDDER: There is no pretence whatever for suggesting that our directors have called up capital otherwise than for the legitimate purposes of the company. I do not see one spot in which any economy can be effected. The only hope is that coal may be bought a little cheaper—but that is exceedingly speculative—and also that coke may fetch more money. I believe these two items have been set down as low as possible. The amount due to the company for gas-meter rentals on Dec. 31, 1873, was £248,844, and the whole of that amount was in the pocket of the consumers at that date. The same remark applies to the coke and residuals. We are necessarily compelled to keep large stocks of coal on hand at such a period of the year. We had also a large stock of coke and breeze, owing to our inability to sell it, and so much of the company's money is wrapped up in that. The total, in round numbers, comes to £391,000 in customers accounts and in stores and materials which were actually owing to the company on the 31st of December, or invested in the stock in hand unused. Against that the only item that can be put is the amount due for coal and stores, £68,963. If that is deducted from the £391,000, it leaves a net of £322,000 as representing the actual capital at that time floating in the business, which is a larger sum than usual. I make the net profit per 1000 cubic feet of gas sold during 1874 8·11d., and I have estimated an increase of 1½ per cent. If, as Mr. Kirkham suggests, it should be 5½ per cent., that would be 4 more.

Mr. BIDDER: Tell me what 8d. profit upon another 4 per cent. of increase of sale would amount to.

Witness: I had better not work it out.

Mr. BIDDER: Mr. Field tells me he has worked it out, and 5½ per cent. would be £6000; deducting 1½ from that would come to about £4800.

Witness: The company have had no experience upon this point at all; they have been anxious to find out from other companies what would be the increase under the circumstances.

Mr. CRIPPS: An increase of that kind might not be provided for, and yet the expenses remain the same.

Mr. BIDDER: The expenses do not remain the same.

Mr. CRIPPS: Some of them do.

Mr. BIDDER: You cannot get gas without burning coal, nor without using labour, and therefore all the expenses are in growing proportions, except the permanent charges.

Re-examination resumed: The residual products would be proportionate to the gas sold, and so would the items on the expenditure side, of coal, purifying materials, wages, and repairs. The wages of the men employed in the retort-houses and our general labour is directly in proportion to the amount of gas made.

Mr. CRIPPS: Do you mean to say, whether the increase next year is 1 per cent. or 5, that it would make any material difference in the amount of wages?

Witness: Yes; it requires so many more tons of coal to make the gas, and men must be employed to do it.

Re-examination resumed: We reckon each stoker will fill so many retorts a day, so it is a simple sum. The distribution charges would not be materially altered, but, like the charges for management, &c., they are simple items. The case most identical with our own is that of the Chartered Company. Their natural increase upon the rate of consumption and the demand for gas has been pretty much the same as our own; and the question is, how much this increase of price has affected them during the past year. On inquiring of them, they told me it was under 1½ per cent. I think the commissioners put it at 7 per cent. in their statement of last year.

By Mr. PATTISON: The expenditure of so large an amount of capital has been a matter of absolute necessity with us. Under any circumstances, whether in competition or otherwise, that must have been done, or London have been in darkness.

Mr. PATTISON: I understood that you had raised capital sufficient to provide for the increased consumption of gas which you may expect to take place in the course of 10 years?

Witness: We have not yet fully completed that; we have only gone to a certain extent. Some portion of the capital is applicable to a 10 million or a 20 million outlay: but we have not yet completed 5 million. I think it is 4½ million. We shall have to make probably 7 millions in the winter of 1874-5. The present works are not capable of making more. The large expenditure has been upon works which are applicable to all time. Obtaining the land and the large works I have described are preliminary expenses almost. As a general rule a wholesale trade would be carried on more economically than a retail one, or one of less magnitude; but I must say my experience with the gas company is somewhat at variance with that. Where I have a question is in the matter of coal. A small company can buy coal to a greater advantage than a large company. A company of the size of the South Metropolitan can undoubtedly obtain their coal to better advantage than we can. They need not look so much ahead as we do in obtaining their stock, and their contracts need not be so far in advance. They can pick up bargains in the market, and adopt expediencies which a large undertaking, having 480,000 tons to obtain, are unable to do. If they make a mistake at all, it will only be one or two ships, whereas if we make a mistake it is 200,000 or 300,000 tons.

Mr. PATTISON: In page 3 of the green book, which contains statements with respect to the Chartered Company and your own, the wear and tear of distribution in your company is considerably less than in the Chartered Company. Can you explain that. I suppose it is a sum written off for the mains?

Witness: No, it is not. I have inquired, and I find they place those charges differently to what we do.

Mr. PATTISON: I observe that you, in wear and tear, and in manufacturing charges, have assessed yourselves at a higher figure.

Witness: If you add the items together, the Imperial advantages vary considerably in the comparison; but when you come to those little things they do not compare. Wear and tear of manufacture is entirely wear and tear within the whole area of the manufacture. The distribution relates to the mains and all out of doors. If you notice the previous item in the distribution accounts, they are very much higher than the Chartered, which arises from our charging wages and salaries to those things, and the Chartered Company charging them to wear and tear, and so on. We have not heretofore agreed accurately in our mode of doing it; but I believe there is some arrangement going on whereby we may do the thing with some uniformity. That leads to this comparison being so unfavourable in some cases, and more so in some of the others. We have very little leasehold property. The Chartered have much more, I believe; and the leasehold we have is for a long term of years. Strictly speaking, there is no doubt a small sum should be written off every year. In 1869 our capital was £1,705,621, and borrowed money £378,000. Since then we have raised £1,027,550, of which we could have raised £833,000, at the rate of 6 per cent. instead of 7. We could not raise any of that by debentures, because we have already reached the maximum amount—£416,000; the average interest upon which, I think, has been given at 5½. If we had raised the £833,000 at 6 per cent., we should have required £8300 a year less for the gas, and that is the only saving we could have effected in capital. We have not set down any increase whatever for wages in 1874 over 1873; the only increase that has been added to wages is that due to purification. There is an apparent increase, but it is owing to the fact that, for the sake of comparison, we have made our accounts this year uniform with the Chartered accounts. The auditor suggested it, and we have carried certain items from salaries under management to the distribution account; and you will find the two things work out together, and come out uniform.

By the CHAIRMAN: The Lea Conservancy Board required us to pay a sum of £500 for the liberty of cutting through the foreshore, in order to make the dock. The dwarf wall was one of their requisitions, and that cost £13,000. The dock was brought before Parliament as part of the expenditure we should have to incur, and was referred to in our evidence and in our estimates. The only deposited plan was in relation to the bridge; the dock was not required, under the forms of Parliament, to be denosited. To cross the navigable stream compulsory powers were inevitable. We considered we were at the mercy of the Lea Conservancy Board as to the question of the dock. With regard to the dwarf wall and the other works imposed upon us, we found we could not construct our works unless we yielded to them in that matter, and we were advised by counsel that we had better make the best bargain we could. Counsel advised us that they were rather merciful upon us not to ask for £20,000; if they had asked that sum we should have had to pay it. The retaining walls near the bridge are unimportant in point of expense.

The CHAIRMAN: Does the amount which is put down as floating capital comprise capital arising from a great variety of sources; for instance, from borrowed money, and from calls on shares, and so on?

Witness: Yes; or it may be in some cases money borrowed from the bankers; and some of the companies have done that; and, therefore, it is not disclosed in their accounts, because it is not their own. It does not appear, and so we may compare unfavourably with some other companies that borrow money largely at that period of the year instead of raising capital.

The CHAIRMAN: Is it to be inferred from that that the company are under no obligations under their Acts of Parliament to allocate capital raised in particular ways to special or specific objects?

Witness: They are not obliged to apply it to particular things; they cannot spend capital for revenue. I presume the auditor checks that item to see that we do not carry to revenue that which we ought to carry to capital, and he exercises his judgment, and on some occasions he questions the items if we are doing what he considers to be not quite in accordance with the views of Parliament.

The CHAIRMAN: I have been endeavouring to ascertain from the Acts of Parliament whether there was any specific appropriation of capital in that way; and under the Act of 1869 the only section I find bearing upon the subject is the 17th, which says that all moneys raised under the powers of this Act by the creation of new shares, or upon mortgage, shall be applied only to the purposes of the recited Acts and this Act. Do the company consider that section enables them to place the capital, as it were, to a common account from time to time for all capital purposes without distinction? Is that the construction?

Witness: Yes, that is it.

The CHAIRMAN: You remember the 25th section of the Act of 1854, which relates to the capitalization of the sums that have been expended out of annual profits in the enlargement and extension of works? The company were authorized to capitalize that in the form either of share or of loan capital, and they exercised their option by creating bonds to the amount of £130,000, and made those bonds irredeemable at the instance of the company. How did they conceive they had authority to adopt that course?

Witness: The bonds being naturally 10 per cent., they could be paid off at any time by the company. Being 10 per cent., they are worth double the value of the amount they represent; and I presume the holders of them required some such clause as that, otherwise they would not represent the value they actually did. There is no indication in the Act of 1864 that it was the intention of Parliament to make the debt an irredeemable one.

The CHAIRMAN: Is it not the case that the mortgages or bonds of gas companies and other statutory companies are not ordinarily irredeemable?

Witness: It is certainly a special occasion to limit it; but it implies we may do it, so that we do not exceed £13,000 a year. The matter was fully discussed before the committee in 1869, and stated in the preamble, with a view of showing that it was understood thoroughly. The clause was drawn up with some degree of care, so as to set the matter perfectly straight for the future.

Mr. PATTISON: You said that other companies borrowed money from their bankers to use as floating capital, and that such borrowing did not appear. If they borrowed from their bankers, and owed it on Dec. 31, it would appear certainly?

Witness: But it would not appear as floating capital.

The CHAIRMAN: It would appear in the balance-sheet; you do not distinguish beyond showing that out of all the capital raised you have only expended so much, and the balance is floating capital?

Witness: By investigating their accounts very minutely you could ascertain the fact; it does not appear as so much share capital or borrowed capital employed as floating capital. If we had borrowed very largely of our bankers at that period instead of raising money, and it so happened money was at the rate of 8 per cent. at that period, we should have had to pay more. If it had not been so, I dare say we should have borrowed from the bankers. We borrow from the bankers sometimes with a view to economy; we always keep that in view and study it, and but for that rate of interest I think we should at that time have borrowed from our bankers. It was raised in November, and then money ruled at 8 per cent. Some bonds were falling due, and the directors thought they might look ahead and provide something for them.

SATURDAY, FEB. 21.

Serjeant SARGOOD: Mr. Parkes's position being entirely official, I take him as introduced by the commissioners. I do not propose to ask him anything. If it should be necessary, I will ask your permission to do so afterwards.

Mr. *Charles Henry Parkes*, examined by the COMMISSIONERS.

The CHAIRMAN: Upon the passing of the Imperial Gas Act were you appointed official auditor by the Board of Trade of the accounts of the company?

Witness: I was.

The CHAIRMAN: Does that Act direct, among other things, that the auditor so appointed shall, with all practical speed, investigate the accounts of the company, and ascertain and certify the amount of their capital, distinguishing share and loan capital?

Witness: It does.

The CHAIRMAN: Did you execute that part of your duty?

Witness: I did.

The CHAIRMAN: In so doing, was your attention turned to the question of the amount of bonds issued by the company bearing interest to the amount of £13,000 a year, and being irredeemable?

Witness: It was very particularly directed to that. That was one of the questions which were raised and discussed at the time.

The CHAIRMAN: Did you form any opinion as to the regularity of the proceedings of the company in constituting that irredeemable debt?

Witness: I did; I looked at the last Acts, that is to say the Act of 1869 and the Act of 1854. Now the Act of 1854, by its 25th section, does this: First of all it repeals the old Acts and incorporates the company afresh. It then gives £1,300,000 as the share capital of the company. It then recites that they have expended out of profits £280,000; and, in order to recoup that expenditure out of profits for capital purposes, the Act authorizes the company to take three methods for their reimbursement, to issue more capital so that the annual sum is not more than £13,000 a year; to create new shares with a preference, with the same restriction, without specifying that it should be the £280,000 or any other sum, or to create bonds or mortgages of the company, subject to the same restrictions. That £13,000 a year is the limit the company were to apply. I look upon that as an absolute charge in perpetuity on the revenues of the company to the extent of £13,000 a year and no more. The company having that option, it did not matter to the public in any way whether they created £130,000 or £260,000 in the nominal capital—the actual charge was the thing to be looked at, and therefore in creating bonds they were within the purview of the Act, and those bonds merely represent the actual charge. About the question whether these bonds should be redeemable or irredeemable, my impression was that they ought to be irredeemable, because if the rate of interest should rise, and they were redeemed, you would never be able to make that money through bonds bearing a higher rate. I could not get out of the difficulty; but I found it was put an end to by the recital in the Act of 1869, which mentions that these bonds were irredeemable, and therefore I considered that Parliament had the whole circumstances before it and recognized it; and, being in conformity with the intention of the Act, the Act of 1854 not being very clear on the subject, there was no point between me and the company on that. If there had been I should have required them to go to arbitration. After full consideration I thought it was within the purview and intention of Parliament that that £13,000 should be a fixed charge on the revenue of the company and no more.

The CHAIRMAN: In certifying their capital, it follows, from what you have said, you include that amount of irredeemable debentures as a proper part of their capital?

Witness: Yes; as a proper part of their capital.

The CHAIRMAN: If the company had been aggrieved by your decision, they would have been able to refer the case to arbitration?

Witness: Yes; there was no point, in my mind, they could refer. I came to

the conclusion that they had acted strictly in conformity with the intention of the original Act, which intention was recognized in the recital of the Act of 1869.

The CHAIRMAN: There is no power in the Act for any one acting in the interest of the consumers to question your conclusion?

Witness: No.

The CHAIRMAN: In coming to your conclusion, have you had regard to the preamble of the Act of 1869, so far as it refers to this point?

Witness: To some extent, but I should have come to the same conclusion under the Act of 1854. I had some little doubt about it at first, but my conclusion was confirmed by the recital in the Act of 1869.

The CHAIRMAN: Now, upon another point, you know well the terms of section 35 of the Act of 1869, which lays down the rules to be observed by the commissioners in fixing the illuminating power and the prices?

Witness: I do.

The CHAIRMAN: Do you remember that the section says, "That the commissioners are to fix such an illuminating power and such a price as shall be calculated to yield to the company, with due care and management, a dividend in that year," and so on?

Witness: Yes.

The CHAIRMAN: Serjeant Sargood, in opening the case of the company, read a letter which the company had received from the Metropolitan Board of Works, which is to this effect: "The board is of opinion that there has been an unnecessary expenditure of capital, having regard to the results to be achieved, and that buildings which would have been adequate to the requirements of the company might have been constructed at much less original outlay, involving a reduced working expenditure; and the board will think it their duty to submit to the commissioners that the requirements of the company might be satisfied by a less expenditure upon works of an improved design." Then the learned serjeant, on behalf of his clients, discussed that letter, in which the board intimated their intention of challenging the company in that particular, and among other things he said that there was considerable doubt, "whether or not the question of due care and management is a collocation of terms applicable to this idea of the exercise of their judgment as to the time and mode of erecting works, and the cost of erecting them, so long as they are within the power granted to them by Parliament, and so long as they are only carrying out the objects that Parliament sanctioned, and the imperative necessity for which Parliament has declared. If that is the only complaint they have to make, I do not think, technically, it is one that you can consider without appearing to sit in judgment on the wisdom of Parliament, a position which I do not think you will be desirous of assuming." The commissioners, knowing your familiarity with the whole subject, are desirous of asking you a question, which, if you have any difficulty about answering, they will not press you for an answer upon, and that is, what is your opinion upon that point which is in issue between the Metropolitan Board of Works on the one side, and the company on the other, as to its being within our province to consider the capital expenditure upon these works at Bromley, in considering the question of due care and management with reference to the charge to be fixed in the present year?

Witness: I feel very considerable difficulty in answering the question. It is a very difficult question, which I should think must be argued out by the learned counsel. At the same time I should say this. If it could be shown, as it ought to be shown, that the company had, by some experiments upon some new theory or patent, expended a large sum of money before they erected these works—upon some theory of their engineer or their own—I cannot help thinking that anything of that kind might come within the province of the commissioners; but it is exceedingly difficult to say whether, in the ordinary course, the commissioners should go into the question of the designs of works made by one engineer or made by another. I am afraid that I must leave that to the commissioners to work out with the assistance of the counsel on each side. Whatever might be the view I might form in my own mind, I do not think I ought to express it.

The CHAIRMAN: It is a question of very great importance to this inquiry; in fact, it seems to me to be the point, and the commissioners, as you say, are very desirous that it should be thoroughly discussed for their assistance and guidance. The question among us is whether the commissioners are entitled, in fixing the amount of dividend for the present year, to have regard to the judiciousness, or the absence of judiciousness, in the capital expenditure of past years.

Witness: I think not upon capital expenditure, otherwise you might reopen the whole question of capital expenditure from beginning to end. I think that could not be done.

The CHAIRMAN: How can you distinguish between the different classes of capital expenditure?

Witness: I do not think you could. It must be some exceptional circumstance beyond the ordinary course which I think would allow you to enter into the inquiry.

The CHAIRMAN: According to your first answer you perhaps would not be inclined to confine the application of the question of due care and management to the mere current management of the concerns of the company during the present year.

Witness: You must, for the purpose of ascertaining what is due care and management, go back to past years with reference to the working of the concern. The data upon which you must act must be the accounts of the preceding years at any rate. I do not see how you can get at the due care and management, taking the question which I mentioned last year—which I believe to be one of the first questions—namely, the quantity of gas they get per ton of coal. What is the unaccounted-for gas; what is the contract price they pay for their coal—all those things are questions which, being done last year, hardly come into this year, and those questions, of course, you can only ascertain by reference to the past.

The CHAIRMAN: Upon such a question as that you can judge of what is likely to be due care and management of the company in the present year by ascertaining what has been the *quantum* of due care and management in the past. That, of course, is quite distinct from the case of the capital expenditure, which has been made once for all.

Witness: Just so; quite distinct.

Dr. ODLING: With regard to the directions of the commissioners in section 35: "That they shall fix such illuminating power and such a price as shall be calculated to yield to the company, with due care and management," &c., is that to be understood to yield to the company, with due care and management, during that year?

Witness: Yes.

Dr. ODLING: And supposing that the commissioners should be of opinion that there is a large excess of capital expended unwisely, and nevertheless, with due care and management, in the current year, they are doing the best they can, do you think the commissioners should have no power to take cognizance of that in such a way in fixing the price?

Witness: You come back to the question raised by the chairman, which is really the question of your powers with reference to the past expenditure on capital account. If you once go into it you open the whole question. At the same time an exceptional expenditure, not in the ordinary course of business, might, in my view, come under that question of due care and management—everything which would be beyond the ordinary expenditure of a gas company; but to compare the plans of engineers, and say this would have been less costly, and this would have been less costly, would not only make the inquiry interminable, but is beyond what is comprised in due care and management. It is one of those difficult questions that ought to be argued out by the counsel.

Serjeant SARGOOD: That we shall do; you need not fear that.

Dr. ODLING: Now, going to another point, the maximum reserve-fund is £81,250, and the actual reserve-fund last year was £68,000?

Witness: Yes: but they have drawn upon it.

Dr. ODLING: That was drawn upon to the extent of £41,000?

Witness: Yes; you may say drawn upon.

Dr. ODLING: Is it your opinion, in fixing the price over the current year, the commissioners should have regard to the making up of that reserve-fund to its full amount of £81,250 in the price of the present year?

Witness: I am sorry to say I have looked at that question, and I am afraid it is so. I think there is a mistake made here, that it ought to run over a number of years, because Parliament did not contemplate what has taken place—namely, such an enormous rise in the price of coal and the reduction of the reserve-fund.

Mr. CRIPPS: That is your impression.

Serjeant SARGOOD: This is the witness of the commissioners, and you ought not to interfere?

Dr. ODLING: I suppose the reserve-fund was actually made up, during the course of a good many years, to be £68,712?

Witness: It is the accumulation of a long number of years.

Dr. ODLING: Still you are of opinion the commissioners are bound to fix a price to make it up to the maximum out of this one year?

Witness: Looking at the strict words of the Act, I am afraid it is so. I am sorry for it. I wish I could construe it otherwise.

The CHAIRMAN: The section in the City Act is different?

Witness: One per cent. on the insurance-fund. That is the way it should rather have been done.

Mr. PATTISON: I presume the opinion you have expressed with respect to capital and our not going into the past accounts is not given officially—your own duty as auditor is to check the account of capital, and not the amount of expenditure?

Witness: That is so.

Mr. PATTISON: If they spent a million more than necessary, so long as it came into the proper account it would not be your duty to comment upon it?

Witness: I go a little beyond that. I see that all the expenditure is for the purpose of the undertaking, and I check both capital and revenue, and, as they know, I have taken particular notice even of the slightest sums being diverted from what I consider the strict purposes of the undertaking; but, subject to that, I have always considered that due care and management should be on the responsibility of the directors, and not me. If I am to manage it, I will manage it, but the directors are responsible.

Mr. PATTISON: The more clearly to explain what I mean, supposing the directors spent £1,661,614, instead of £661,614, if the vouchers are all properly produced, and it appeared in the accounts, would you pass it?

Witness: Being all for the purposes of the works?

Mr. PATTISON: You said you thought due care and management was measured by the cost per 1000 feet of gas sold; and that was the real question for the commissioners to settle?

Witness: I beg pardon. What I said was this: As regards the consumer, the question first arises what quantity of gas ought they to make per ton of coal, and what quantity of that gas ought they to sell to the consumer, there always being, as we know, a certain quantity unaccounted for. That is the first question. Of course there are a vast variety of other questions. That strikes at the whole root of the thing, in my view, as regards the great question of price.

Mr. PATTISON: Is it not equally important to the consumer to have considered the amount of capital employed in producing it. Supposing one company produces the same quantity of gas as another, and the one employs two million and the other one million of capital, that question, of course, would be very material to the consumer?

Witness: Yes; but there seems such a variety of questions—the question of the cost of the station—the question of the costs of the works, whether it is put upon made ground or rotten ground. So many questions may enter into it that it becomes exceedingly difficult to say that that forms an element in an inquiry of this kind.

Mr. PATTISON: I have no doubt it is exceedingly difficult, still, as it goes to the question of due care and management, I cannot help thinking the question of capital does come in?

Witness: That I would rather you should thrash out with the counsel.

Mr. PATTISON: You were saying that you thought we would not go into past accounts?

Witness: I understood the question to apply whether you could reopen the whole of the capital account.

Mr. PATTISON: If you are to open the whole, one does not know where the limit is. Assuming there was extravagant management last year of the Imperial Company, the Imperial Company did not suffer by it, because it had a reserve-fund to draw upon. If the reserve-fund this year is to be made up, it becomes exceedingly important to know that there was due care and management in the last year?

Witness: I think the commissioners are bound to take all circumstances into their consideration, and the management last year, in my view, would be an element in their consideration.

Mr. PATTISON: That is what I want to get at; it is of vital importance to the management at the present time. Now, one other question as to the labour and renewal of mains. I presume you have considered it part of your duty to check that?

Witness: Once for all, if you will allow me, as the question may arise afterwards, to explain the principle which is adopted not only in these companies, but in other companies with which I am connected. With reference to the depreciation, there is depreciation of what you may call the capital of the company. That, I may take it, is such a thing as where the company erect works upon leasehold land. The works being attached to the freehold, at the end of the time the company would suffer a clear loss; therefore, there should be a fund to be applied to depreciation account. There is also another kind of depreciation-fund, to be applied to capital, which I can best illustrate in this way: two companies in which I take an active share of the management—one a railway company and the other a dock company—employ a large number of sacks for the purpose of the grain trade—the railway company about 300,000 and the dock company 100,000; the railway company make no depreciation-fund for the sacks, although they are a perishable article. They make up their stock for the year to the same quantity, either by purchase or renewal; they keep it up to the trade stock; they trade with the district, which is an agricultural district. The dock company have a large grain trade also, but, inasmuch as the grain trade may cease at their docks, they write off from capital every year so much as they consider the life of the grain trade will be there, so that at the time when a more profitable trade may come than the grain trade, they may not have it depreciated at that time by having their sacks useless, and that is the proper principle as regards perishable articles of that kind. But as regards mains, it is the same thing as with rails; all the mains in the district ought, by repairs and renewals out of revenue, to be kept up to the standard, and to be able fifty or a hundred years hence to perform the same duty that they do now. It would be an injury to the present consumer to charge a depreciation upon that, and write it off against capital; therefore I have objected to a depreciation-fund being formed in this company, for the purpose of writing that off against capital as against the present consumers. There are cases in which, for the purpose of equalizing expenditure,

we make a depreciation-fund, which is a reserve-fund; that never goes to capital—it is a part of revenue.

Mr. PATTISON: There is a small amount of leasehold property belonging to the Imperial Company, should you not think that a sinking-fund should be formed?

Witness: Wherever the leasehold is equivalent in value, that is where it is a lease for a long term, say 99 or 999 years, which is equivalent to a freehold, it is not necessary, but wherever the leasehold is within a reasonable time of expiry a sinking-fund should be commenced. For 999 years you would only put by £2 a year, and the 99 years is pretty nearly the same. The time will come when the sinking-fund will be requisite; I have drawn the attention of some of these companies to it. In another company where the term is getting on I have drawn the attention of the directors to the subject, and have said they must soon commence a depreciation-fund for the leaseholds. Where it is mere land, depreciation would not apply; it is only where there are buildings fixed upon the land which will go with the freehold, and will be a loss to the occupier at the time it is given up.

The CHAIRMAN: You observe that the Act does not expressly direct the commissioners to investigate due care and management; due care and management is put in parenthetically as it were?

Witness: Yes.

The CHAIRMAN: Might it not be contended that the words may be construed in this way, to yield to the company a dividend of so much, due care and management being presumed? Would that make any difference?

Witness: I do not see the distinction.

The CHAIRMAN: Due care and management for the present year being presumed?

Witness: Yes; the construction of this Act is exceedingly difficult, and questions are constantly cropping up as to the mode in which it should be read. It is quite possible that that may be a subject of contention, and would perhaps be fairly a subject of contention, that due care and management being presumed for the year, the gas should be such a price and such an illuminating power.

The CHAIRMAN: Does it strike you that that construction might be answered to some extent by the observation?

Witness: If that is the meaning there would be no need of Parliament constituting a body of commissioners to deal with the subject? I think you must still have a commission. Where is the presumption to come from? You must fix it somehow.

The CHAIRMAN: Might it not be said that it was a mere question of calculation of what would be the amount necessary to pay the dividend, due care and management being presumed?

Witness: No one can fix that price without ascertaining what has been the working of the company; and, as I said before, what is the gas you can supply from your materials.

The CHAIRMAN: At any rate, I suppose you will agree there is something in that answer, and the mere fact that Parliament has constituted a body of commissioners may be taken to imply that they are to investigate the past, and that they are to apply to the future the results of that investigation?

Witness: My view is they must do so, that they cannot arrive at any result unless they do.

Serjeant SARGOOD: Would you not consider, in ascertaining the due care and management, that that would be limited to the care and management in obtaining the profit from the gas during the past year, and not to the question of care and management in the outlay of the capital?

Witness: That is the question I have been avoiding. I want you to argue that out—it is a special question; although I may have my own views on the subject, I think it is a proper thing to be argued out. I do not think you should quite put that upon me. Do you want to ask me anything about the working capital?

Mr. PATTISON: Do you consider that the floating capital of this company is unusually large?

Witness: The balance at the end of December is, no doubt, unusually large for floating capital, but there are two elements to be taken into consideration in that. If there were no works proceeding, it would be unreasonalby large; but they have a large amount still of their contracts outstanding, and they must provide capital for their operations as they go on. I have not gone into the books this year since the 31st of December. I have not examined the payments, but I imagine the January payments would show a considerable reduction of that.

Mr. PATTISON: It is upon the notes that a very large amount was expended in January, and that they have had occasion to borrow from their bankers?

Witness: I would explain as to working capital. A new company starting say upon the 1st of January, and making, we will assume, a rental of £100,000 it would have to pay in advance for wages and all other things in the first quarter equal, at any rate, to the expenses. Then in the next quarter comes the rental and replaces that, therefore you may say the working capital of the concern should be about its working expenditure (I do not mean within a few thousands), its working expenditure of the one quarter preceding, because the rental comes in and supplies its place. The quarters vary very much in their expenses, and it is almost impossible to take an absolute figure. It is not necessary in railways, because it is a ready-money business—they may overdraw their capital account; but it is the advances made by this company as a manufacturing concern that render it necessary.

Mr. PATTISON: Do you find that these gas companies carry on their business upon the usual trade custom, that is to say, with respect to the purchase of coals and the purchase of other ingredients required, and likewise with respect to the terms upon which the sales of residual products are made, because those things necessarily enter into the question of the amount of working capital?

Witness: The coal contracts are made with all companies much in the same way as with railway companies and gas companies, every one of them; they have either tenders or open contracts; that is, open competition. They have the same arrangements, they get the price of the day, and they purchase their coal as they can, as they have been obliged to do lately; and, with regard to the sale of the residuals, a great deal depends upon the position of the station. In a low neighbourhood, the coke goes off much more easily than when the sales are made at a distance. If the station is at a distance from London it is absolutely necessary to contract with some one to sell it; they cannot sell it upon the spot. At many of the stations they get the carts coming in and taking a large quantity off, and in some of the stations there is a large quantity of coke supplied for heating purposes to public buildings and other places.

Mr. PATTISON: Is there a sufficient divergence among companies to affect the proportion of working?

Witness: Well, not appreciably—not to any great extent; the coke comes in. The other products are ledger accounts—they are taken by different people. Tar is taken by large firms, and other products are taken generally by large firms, and they are paid for at certain times; but the coke comes in day by day, if it is sold at the works, and some is for ledger account also. To say that a very large difference would be made in the working capital of two companies having the same quantity exactly in the manufacture, by reason of the difference of situation—I think there is no occasion to make such a difference.

Mr. PATTISON: In the examination yesterday of Mr. Chubb it came out that the large companies were unable to make such good contracts for coal as the smaller companies, and that accordingly a large company carries on its business at a greater cost than a small company?

Witness: I should be sorry to say that, but it may have been so lately.

Mr. PATTISON: Does it appear to you reasonable that such should be the case?

Witness: That may have been lately during the derangement. I think that has been so perhaps. That the large quantities of coal ordered by a large company are difficult to obtain, whereas smaller quantities can be more easily got from a larger number of people; I should be sorry to think that it was a permanent necessity.

Mr. PATTISON: Why should not a large company enter into twenty contracts instead of one?

Witness: In the ordinary case I should say the large company ought to obtain its contracts for coal as reasonably as the others. In recent times there is no doubt there has been considerable difficulty in getting coal at all. I know that has been the difficulty lately.

Mr. PATTISON: Is there any other item in the account the subject of greater cost of management, between a large business and a smaller one, than the item of coal?

Witness: No, I think not; I think the assumption generally is, the larger the company the greater the economy. I should be sorry to say much at present about the effect upon a large company, because the Bromley works of the Imperial Company are not developed. I think last quarter they only carbonized about 1900 tons of coal, and the make of gas at Bromley was only 16 million feet, speaking from memory. It strikes me that until you can see what the company can do in the way of economy at that station it is exceedingly difficult to answer what is the effect upon a large company.

Mr. PATTISON: I pointed out yesterday to one of the witnesses that the cost of wear and tear, or rather the sum set aside for wear and tear in distribution, was very much larger in the Imperial Company than in many other companies, and it was explained that some items which are charged to the Imperial wear and tear are not charged in other companies, that is to say, the accounts do not strictly correspond?

Witness: That is so. As auditor of three of those companies—viz., the Chartered, Imperial, and South Metropolitan—I have been trying for years to get the practice uniform as to what should appear in each specific item of the account. As Mr. Field well knows, I have been endeavouring to put him in communication with the others; I am exceedingly anxious to do so, though it is a matter not of primary importance, yet it is of importance; and I have been exceedingly anxious not to disturb the arrangements of the company for fear they should put it upon me. You have disturbed our arrangements in these matters. I hope a time will come when we shall be able to get these companies into strict uniformity, so that each item may represent as nearly as possible the same thing in each company.

Mr. PHILBRICK: We cannot make a comparison of the two?

Witness: You can of the whole, but not of each part; one man has got such and such data and such and such things charged to wear and tear of manufacture, and such and such of those things charged to distribution; if the man takes both it is difficult to apportion his salary—and the same with regard to stores.

Mr. RICHARDS: I think I may say you have not made any suggestions that we have not adopted?

Witness: That is so; it must be done by arrangement between the accountants themselves; they must try to work it out.

Witness examined by Serjeant SARGOOD.

I have said it is reasonable the company should have a floating capital that should represent the money they are out of pocket in giving credit to their customers. The accounts are made out quarterly, and therefore a quarter's expenditure will have to be made before they can reasonably expect to be recouped by their constituents. The accounts then begin to come in, and before the end of the next quarter the collectors ought to have collected them, less a per centage for bad debts. If the company cannot get in the whole of the first quarter before the half of the next, they must go on providing capital for expenditure until that period. I could not fix the amount. During the time they would be getting in a certain amount from the coke sold. I should think they might do with a little less than a floating capital equal to a third of the whole expenditure. During the winter quarters the expenditure is heavier than in the summer, and the floating capital will necessarily be larger.

Serjeant SARGOOD: In the course of your audit of the Imperial Company's accounts have you found that there was any amount of needless floating capital lying idle through any improvidence on the part of the directors?

Witness: No, I think not. The general run has averaged about £150,000 as the floating capital.

Serjeant SARGOOD: The large floating capital at the present moment is accounted for by the large works going on?

Witness: The capital has to be called up a little in anticipation of the payments to be made. That is what I looked to when I noticed the large balance on capital account outstanding at the end of the year, and that seemed to be the solution of it.

Examined by Mr. CRIPPS: The gas-rents begin to be received as soon as the quarter finishes, and are received during the quarter; the expenses also begin and are incurred during the quarter, but you have to take the company from the beginning, and see what is required, and that is the floating capital. The residuals are a considerable portion of the receipts. A certain portion of the coke sales are for ready money; the other products are generally sold to a ledger account. Coal is paid for every month. The floating balance of the company at the end of 1872 was £97,000. If the capital account had been closed they could not have obtained the £300,000 for carrying on the trade last year. It is not closed, because they obtained power under their Act to raise additional sums for additional purposes. My duty is to audit the accounts only, but if I see anything I tender my advice. It is not for me to say whether this or that expense has been wisely or properly incurred. I scarcely ever raise a question; the relation between me and the company involves only the accounts, and not the question of due care and management.

Mr. *Thomas N. Kirkham*, recalled by the COMMISSIONERS.

By Dr. ODLING: During the month of October the coals carbonized were 15,888 tons, which in round numbers would correspond with 5 million feet of gas per day. The cost of purifying the gas made from that quantity of coal was £521. The quantity of lime required was about 400 tons, at 12s. a yard. Dividing the 400 tons by the 31 days in the month, we find that it takes 13 tons of lime for each 5 million feet of gas. At one time we were using, in the purification, oxide of iron, and under those circumstances we had eight purifiers of lime and four of oxide.

Dr. ODLING: Now, supposing you had purifiers entirely of oxide, how much more oxide would you have required than you actually used when doing the greater part of your purifying by lime?

Witness: Practically little or none, because we were then using lime only to search out those particular compounds of carbon—the sulphuretted hydrogen was still going forward. We passed our gas, in the first instance, through lime and then through oxide. The lime would take up the sulphuretted hydrogen to a certain extent, but we had not surface enough.

Dr. ODLING: If you had purified entirely by oxide, the cost would not greatly have exceeded the cost of the oxide used when you had this expenditure for lime also?

Witness: It would depend, in a great measure, on the age of the oxide. The

oxide we were using was entirely new, and that makes the cost then look rather small. We changed our contract at the time, and the oxide was all new. The quantity of oxide bought was taken over the whole year, because, from past experience, we calculate it will last about twelve months. The cost of the oxide per million feet would be about £3. Up to November, 1873, the person supplied the oxide at 1d. a ton of coal carbonized, or 1½d. taking back the spent oxide. Since then we have bought it at so much a ton, and the spent oxide is our own. We have not yet had an opportunity of knowing what we shall do with it. It is a saleable article, but what we shall get for it I do not know. At present we are using eight purifiers of lime and four of oxide, in two sections. The cost for filling and refilling them will be more, on an average, than if we confined ourselves to the old practice of using oxide; because the oxide purifiers would be changed about twice a week, at this season of the year, while the lime purifiers are changed each day. I think that 2·75d. represents the cost of emptying and refilling in the case of lime, but in the case of oxide it would be something under 2d.

Mr. CRIPPS said he did not know what the figures were to which witness was referring.

Witness: The sheets put in yesterday with regard to purification.

Mr. CRIPPS said he could not go on without seeing them. It was obvious that this question of purification assumed a much greater importance than it did when Mr. Field's analyses were made out, in which the purifying and sundries were put together. He asked that they might be separated.

Serjeant SARGOOD said it should be done.

By Mr. PATTISON: I am not aware of new processes having been introduced anywhere during the last year in the manufacture of gas.

Mr. PHILBRICK: There is one question I should wish to ask you—whether, at Fulham, at which this purification question has arisen, the company had their scrubbers in perfect order, and whether they had sufficient scrubbing apparatus?

Witness: We had in the month of October.

Mr. *E. Vaughan Richards*, examined by Serjeant SARGOOD.

I have been for more than a quarter of a century a director of the Imperial Gas Company, and, in the year 1860, was elected deputy-governor. In 1863 I was elected governor, and remain so still. During the whole of this long period I have given very great attention to the affairs of the company and its working. The company were very much pressed for land and capital in the year 1865, or rather, I should say, before that. In that year we went to Parliament, and carried a bill through the Commons, for additional land and additional capital. That bill went up to the House of Lords, where it was strenuously opposed by the Bishop of London, who conceived that there would be an increase of the works at Fulham, which might affect his palace at Fulham, situated about two miles off; and his influence, and that of others in the House of Lords, led to that bill being thrown out. In the next year, 1866, we brought in the same bill, having satisfied the Bishop of London with a certain clause, for the same land. We passed it through the House of Lords, and when it came to the Commons we were met with a tremendous outcry as to the possibility of its being a nuisance to Victoria Park. That outcry was very well worked out, and we were defeated. At that time we were driven to the greatest possible straits for want of capital, and also for want of land, but especially for want of capital. I went to my late friend, Mr. Edward Egerton, a member of the Standing Orders Committee, and I represented to him the difficulty we were in with regard to capital, and then the bill was revived in the shape of a money bill, and it was under those circumstances that we obtained the £325,000 under the Act of 1866, and that £325,000 was limited to 7 per cent., which was the first time that any such limitation had been imposed upon a metropolitan gas company, 7½ per cent. being the lowest at that time. Then came all the discussions in 1867 before Mr. Cardwell, but nothing came of that except a report from the committee, with which, of course, you are familiar. Then came the session of 1868, when the Chartered Company's bill was passed—the City of London Gas Act, as it is called. The Imperial Company also had a bill, and when the Chartered Bill was over, Mr. Cardwell, who was chairman of the committee, sent for our counsel, Mr. Denison, but he was not able to come, and it so happened that I was called in, as chairman of the company, and Mr. Cardwell said, "Will you accept the bill that the Chartered Company have accepted?" I said, "No, I will not;" and I said, "Let me tell the committee why we cannot afford to do that." We then pointed out to Mr. Cardwell this material difference, that we stood by our reserved fund, as an essential thing that we had at that time, of £80,000 and upwards; and although the Chartered Company, who had no reserved fund, only gave up the right to create one, it was a very different thing with us, because we were called upon to give up £80,000 that we had laid by for a number of years. I also pointed out that we were willing to take 7 per cent., and, as that would apply to £1,300,000 as compared with the Chartered Gas Company, it was evident that we should lose £39,000 a year, and I said, on consideration, we thought we were entitled to maintain our 14-candle gas instead of the 16-candle gas, having up to that time given that thing with the utmost liberality. Mr. Cardwell, said "Very well; we will not listen to you;" and in the result the bill was refused. In that year we were asking for our present land at West Ham. We had to look for a new site, because the Victoria Park agitation was too much for us. In 1869 we obtained our present bill, and almost in its present shape. We agreed with Mr. Cardwell, but there were some powerful members of the committee of 1868 who caused the bill to be recommitted, and there were added to the committee two metropolitan members—Mr. John Locke, the member for Southwark, and Mr. Alderman Lusk—and the matter was discussed again, but the committee, for the main part, abided by their original resolution. There were some alterations made in the amount of the reserved fund, and also the contingent fund, but we got expressly their sanction to the reserved fund and the 14-candle gas, and *per contra* we accepted the 7 per cent. Comparing it with the Chartered Company, who had the power of raising all their capital at 10 per cent., we abandoned 3 per cent. upon the capital that we raised, which, coupled with the old money, was equivalent to £39,000 a year. Under that Act our normal price for gas was fixed at 3s. 9d., the same as under the City Gas Act. In 1868 a great deal was said as to the possibility of an alteration in the price of raw material and in the rate of freights, and so on. I remember suggesting the probability of a French war giving rise to a rise in the price of coal, but the notion was treated with ridicule. However, it was agreed that such things might take place, and hence was introduced these clauses, which are now taken as the revision clauses. Under that Act we were allowed not only to acquire new land, but also an acquisition of capital of £900,000, which with the money bill made up the £1,300,000.

Serjeant SARGOOD: Now I will call your attention to the description of stock that you are entitled to raise, whether it is to be either the ordinary stock, which by virtue of the Act would give 7 per cent. dividend, or a preference stock which would bear only a 6 per cent. dividend. May I ask you, have the directors the power, of their own personal motion, of saying which it shall be, or is it the shareholders?

Witness: It is the shareholders. At the same time, if the directors had formed a very strong opinion, and were to express that strong opinion to the shareholders, I have no doubt it would have a considerable effect in influencing them. I personally saw a large number of the most influential shareholders, and I talked with them as to the best way of raising the capital, and every shareholder naturally said, that as a holder of the old 10 per cent. stock he should naturally object to have a sum of £1,300,000 6 per cent. preference put upon the top of his stock, because, as he said, "it will depreciate my property;" and there was no answer to it. Again it was said, that if you go and create this as a 6 per cent. preference stock, how are you to raise capital hereafter? Are you to raise it again above that preference, or are you to suppose that anybody will take stock which is to rank subsequent to the 6 per cent. preference? I most unhesitatingly say that Parliament having given us the option of raising it as ordinary stock, or as 6 per cent. preference stock, it seemed to me to invite us to use our own discretion as to which of the two should be adopted, and we adopted that which was most to the advantage of the shareholders. I have always regarded the notion of raising money by preference shares as the resource of people who cannot raise it by ordinary shares, but unquestionably the thing that weighed extremely upon my mind was this—what we were to do with the capital hereafter to be raised, supposing that we had created this 6 per cent. preference stock. I did not consider that it was to the advantage of anybody, either the public or the shareholders, to issue it at 6 per cent. preference over a 7 per cent. stock, for this reason, that I thought hereafter some very considerable difficulty might be found in raising stock if we had to issue the 6 per cent. preference. I did not see on what ground I had a right to ask a holder of 10 per cent. stock to put a mass of this stock in front of him. I have had a due regard for the public, but you must not tell me that I am to neglect my own shareholders.

Serjeant SARGOOD: As a member of the direction, do you not consider that your primary duty to your shareholders and the public is taken care of by the Act?

Witness: By this very bill we abandon to the public £39,000 a year in the shape of that 3 per cent.: if we had chosen to accept the terms in the Chartered Bill we could have had 10 per cent. upon the whole of our stock.

Mr. CRIPPS: But you remember you must then have abandoned your reserved fund?

Witness: I think it very probable we should have had to reduce our reserved fund very considerably, which was then about £80,000, and to have given two candles more. Perhaps you will allow me to say, with regard to the consumers, that it has been more than insinuated—in fact, it has been distinctly stated—that in spending the capital upon this occasion, we have distinctly expended it, as I understand, knowingly and wilfully for the purpose of getting out money at 7 per cent. I can only say, had I or my co-directors spent one shilling capital for that purpose, I should consider that I had behaved like a rascal: I should simply consider it to be dishonest. I do not think that my friend, Mr. Cripps, meant that.

Mr. CRIPPS: I dare say you understand the way in which I put it.

Serjeant SARGOOD: A line must be drawn, and so far as your company are concerned, whatever view may be taken of the legal question, whether or not this commission is entitled to discuss that subject, you at any rate, on behalf of the public, invite them to consider it, and to express any opinion they please?

Witness: I have listened, being a lawyer, with some sort of interest to what has taken place, as to whether you are or are not entitled to examine into due care and management in the expenditure of the capital account. As a lawyer, it is no part of my business to give any statement upon that, but as an honest man I invite you to ascertain whether a single £100 has been improperly expended, and I may also say I hope you will go and see the works.

Examination resumed: When we began the expenditure at Bromley, our other three works were as full as they could hold, and now that these new requisitions of the referees—which I consider humbug—have forced upon us this purifying process, the manufacturing power of our works is reduced. Not having the power to carry it out in full, the only alternative has been to reduce it to the manufacturing capacity of the works, and to sink lower, not only the normal increase that goes on from year to year, but the increase that comes from the throwing open of the other works. The first question with reference to Bromley was as to the quantity of land, and the instant it was understood that our manufacture was likely to be established there, the people who owned the land, which is little better than a marsh, all began to open their mouths very wide, and we found the only chance of getting it at anything like a reasonable price was to buy a quantity at once. It is also desirable to have around your gas-works a margin, otherwise people come and build close to your works, and in a couple of years they indict you for a nuisance. That induced us to buy the quantity of land we did buy; and I think, upon the whole, looking at the prices given in analogous cases, we have got the land very fairly. I do not think we have paid unreasonably for it. We have purchased 150 acres, which, I think, will afford the largest manufacturing power it is possible to concentrate at any one spot; because it must be limited with your power of getting away with your mains. I am told that we may rely on making 30 millions in time; and I cannot conceive any company making more. In making that particular purchase of the land, the board went to work as a private individual would do, serving his own interest. There are some things done there which must be looked at as surviving for all time; not merely for the present consumption of gas. The bridge, for instance, was a thing essentially necessary to begin with, and not only for the sake of connecting the works with the population there, but also as a means of carrying the large mains across the river Lea. We went into the matter with the greatest possible care. Our engineer gave us plans of the bridge; and it was then found that we were dealing with two navigable channels, and we could not help feeling that if a catastrophe should occur, the public would turn round upon us and say, "How came you to build a bridge over a navigable river by the advice of your own engineer only?" and therefore we called in Mr. Peter Barlow as to the construction of the bridge. That, of course, involved a certain amount of extra expense; but that bridge was erected thoroughly, and it will stand, I may say, for all time. The next thing is the dock; no gas company being able to get on satisfactorily and with due economy without having water carriage. There was the river Lea running, as it were, around our works. And it was found absolutely necessary to have a dock in which we could take the barges, bringing them in at high water, and the question immediately arose, are you to build this a sufficient size for four or five millions a day, or to make it as large as in all human possibility it will be ultimately required. We took the best advice, and we came to the conclusion that the best thing to do would be to build it for what will be required ten or twelve years hence. Four retort houses stand round the dock. I have heard it suggested that we might have built our dock in sections; but all that time the first pier built must have been out of employ. I am not a dock maker, but those who are used to making docks said, "It will not only be a bad thing for the dock, but it will be thorough bad economy;" and if I had not believed that, I would not have voted for the construction of it. Then comes the question of mains; what mains are we to have? You will remember we are to drive from this place a very large quantity of gas, and therefore we determined to put down and to make this bridge carry two 48-inch mains out of the works under the bridge which is to carry them, and bring them into this district. It was said, "Why not put in a 24-inch main till you get properly into working order, and then take it up or supplement it?" We did that very thing at Fulham. We put down a 26-inch main from the Fulham works, running up to the top of Kensington Palace Gardens without a break in it, but it was found a very few years afterwards necessary to open all the ground along the King's Road again, and put down another 36-inch main, and four years after that we had to put down another 36-inch main. Now the expense of that is very great, but infinitely greater is the annoyance and inconvenience that people suffer during the laying of these mains, which is a very great injustice to the public, and I must unhesitatingly say that it was good economy to do it as we have done it. The retort-houses will be just sufficient, I believe, and not more than sufficient, to supply what we shall re-

quire from these works next winter—six or seven millions. We have two gasholders at work, which will hold just about what they ought to hold for a make of seven millions; that is to say, they hold two million apiece, and four million is the very least that you can economically work. About four-fifths of your manufacturing power ought to be represented by your gas capacity. We have also three tanks ready for gasholders when they are required. If we had waited till we wanted to erect the holders, we should have had to take all the water out of the two in use, because the pressure would be too great; therefore we found it good economy to put the wells in these three. You must bear in mind this cannot be done during the summer, when we could afford to run down—they are so large—therefore I say that was proper economy. And, in addition, we had the most eminent builders in England, the Messrs. Aird, upon the ground doing these things, with all their materials there, and it was found obviously cheaper to transfer all these materials to the adjoining grounds, and to make these works then, than to postpone them; and also we knew at that time the price of all building materials was gradually rising, and we were perfectly certain that we could build them cheaper than we could two or three years hence; and I may say I am informed that we have saved £100,000 by that. Our old stations were encumbered with work sufficient to make the full amount that the space would possibly admit of. When the purification requirements came into vogue, we found we had not space to purify all we made, and all we had to knock off from the manufacture at other places required immediate accommodation at the new places. We originally commenced our new works with the idea of continuing the purification with oxide of iron.

Serjeant SARGOOD: Did that involve a large expense as to pumping and exhausters, and so forth?

Witness: I do not know as to pumping and exhausters, but it involved a large expense. I am by no means prepared to say that it is to be done away with. The peroxide of iron is used over and over again, as Dr. Odling knows. Being spread out, it takes up the oxygen, and is again fit to be put into the purifier, and used over again, and for that purpose you require the means of spreading it out, and it must be protected from the weather. The consequence is, that we have had to build revivifying houses. It may be said that these revivifying houses are in excess of what is actually required, but they will not be in excess if the lime is required. I do not know that they are in excess as matters now stand, but they are certainly not in excess of what would have been required had not the lime purification come up unexpectedly. With regard to the works, they are as substantially built as any works in this world; and I undertake to say that there has not been a five-pound note spent upon ornamentation, because we thought it out of place with gas-works.

Serjeant SARGOOD: Having laid out as much as you have at this time—although it is only a portion of what you must lay out—were you only just in time for the exigencies for the current winter?

Witness: We were only just in time. The whole machine must be able to be put into working gear, and it was just ready at the time; and if, instead of its being, as it has been, a remarkably open winter, we had had a very cold winter, I have no doubt we should have been driven more into Bromley than we have been. We could easily have gone to Bromley, and have made a great deal more gas than we have done, but I assert we have made it in a way that must meet with approbation. As you know, there must be a time when works will fructify.

Serjeant SARGOOD: It is only a return from such portions of them as are now in operation?

Witness: Certainly; they have only been in operation a few days, and this rise in the price of coal has come and caught us as we were doing this work, which, if left to fructify at the ordinary price of coal, would never have disturbed our arrangements at all. At Fulham, by reducing the make, we have space enough to give the lime purification a fair trial, but at the other places we could not do it; it was impossible. You must bear in mind throughout we have not looked to a very remote future, but to a reasonable future. Take such a place as Dover, where you might run up a few retort-houses under a tarpauling; that would be madness here. And so with regard to the construction of the works. I have heard it said—and there are plenty of doctors to give you advice upon questions of this sort—"At the price of iron, why not make all your works of brickwork? all iron girders should be excluded." We took as good advice as could be found in England from our own engineer, Mr. Kirkham, and we came to the conclusion that, looking at the stability of the works we were adopting, the proper course was to use iron.

Serjeant SARGOOD: Now let us come to the internal management of the company. It has been thrown out that gentlemen who are directors of a gas company know nothing about coal. Now, judging from your own experience of making contracts, you can hardly have been connected with a gas company of this particular description without knowing something about coal?

Witness: I flatter myself I know something about it. When we are making these contracts with reference to coal we get the best information that we can. We try and get tenders from different people. The price is not material merely, but the quality. One coal may be a little less money per ton, but it is not a cheaper coal. Last year was a most disastrous year, as everybody knows. In the first place the question was whether we could get the coal at all. We want an enormous quantity—420,000 tons a year—and we contracted in the first instance for about half the quantity with men who stand as high as any men in that particular trade, and the prices they asked were 32s. and 30s. a ton, and prices of that kind were paid by other companies. We have dovetailed them with our other contracts, and so we have got at the 26s. rate in the contracts. With reference to the price that may be expected hereafter, I cannot conceive anything much more difficult to arrive at. I have gone to people and I have talked, not as if doing business, but pleasantly with them, to know what the price of coal is likely to be, but could get nothing out of them. I said to one gentleman, "What can you do a thousand tons at now?" and he said "17s." I said, "I suppose 16s.?" He said, "I do not know that." We cannot call these men here. If they came here and stated a certain price, and you were then to beat them down, when you come hereafter to make your contracts they would throw that in your teeth. That people may be called who will tell you that they will sell you coal at 13s. a ton is possible, but the question is the stability of the men and the quality of the coal. The direction is divided into three committees—a committee of works, a committee of accounts, and a committee of general purposes. I, as the chairman, am a member of all committees; and, practically, I find the committees work very well. They meet every Wednesday at St. Pancras, and on alternate days at Fulham and Shoreditch. All the questions of the coal contracts, and every single thing connected with the company, is regarded by them; there is not a bolt, or a screw, or a nut that is purchased without my personal knowledge and my personal signature attached. The list, being made out by the resident engineer in the first instance, is vouched by the engineer, and then submitted to the committee of works; and before them also come the inspectors, with their returns of all work done from day to day, with the time-sheets, all of which are examined. They receive all the wages-books made up for the week, which are always carefully compared and gone into, and the price per ton of material, and any rise is thoroughly inquired and examined into—one director makes that his business. Then the illuminating power, which is now taken by official testers, is looked into by them. The working of the different stations is monthly gone into, and if there is anything that we are dissatisfied with, the engineer has to give an explanation. The price of coke is also regulated by the committee of works—in short, it regulates itself. We get the best price that we can screw out of the public for the coke, and for a short time it ruled—for about four days some months ago—28s. a chaldron. Lately, we have been selling it at 12s., because we found at 14s. we could not get rid of an ounce of it. The cold weather came in a few days ago, and we instantly raised it to 16s.; then the warm weather came in, and down went our price. We cannot store beyond a certain amount of coke—we must clear the place. We can store it better at Fulham than anywhere else. That brings us also to another point about the coke, which is the possibility of the price we may get this year. It is talked of as 12s., and the directors, after discussing the matter, have agreed to assume 12s. as the price; but I do not hesitate to say my opinion is decidedly against that. Here, again, it is a matter of speculation. I go to a man largely connected with the matter, who deals much in coke, and I learn from him it is much more likely to be 8s. or 9s. than 12s. When you are storing your coke, you have to carry it to a heap, and, if you keep it long, a great deal of it becomes breeze. The committee of accounts undertake all the account department; they look through all the accounts, and test the cash balances to the last shilling. They examine the bills, and recommend them for payment to the board, which sits on Friday, and ultimately draws cheques and pays them. The committee of general purposes sit on Thursday, and they receive all the money brought in by the the collectors. I do not mean to say in cash, but the bankers receipts, and they also receive any complaints that people may think it desirable to make in person; they are generally by letter, and are attended to at the office. Then, on Friday, the board meet, of which I am chairman, and they take up the threads of all these committees, and, generally speaking, confirm the resolutions which the committees have come to. If there is anything referred to them for decision, they discuss the matter among themselves. Every shilling in the shape of money paid out is paid out with the confirmation of the board. The board are responsible for everything the committees do, and they profit by the consideration given by the committees to the various matters. There is also the general business of the company, which necessarily comes before the board in the first instance.

Serjeant SARGOOD: As to the great difficulty with regard to the coal question, will you give the commissioners an idea of the course you have taken with a view of buying in the best possible manner and in the best market?

Witness: Having been connected with the company for some time, we most of us have some acquaintance with gentlemen in the coal trade, and we make the best inquiries we can among them. We have persons upon the Coal Exchange—and persons especially in the interest of the Imperial Gas Company—who make inquiries, we know not how, as to contracts offered to other people, and finally we ask various people to send in their prices. We are peculiarly situated in this way, that we want enormous quantities, and there are few people who can be trusted. I do not know if there are any coalowners present, but the coalowners are rather a ticklish lot, and there are very few people that you can trust to for large quantities. In winter time we carbonize as much as 600 or 700 tons a day, and any check in the supply would be destructive to us. It has been suggested, why not have a large number of contractors? The great objection to that is that you are liable to have your coal come in in an enormous glut. If you have 20 men sending in coal, they will all send in upon a favourable wind, at one particular time, and that would be an extremely expensive mode of doing it. It answers our purpose very much better to get a few big men. Now, we have six, three of whom are conspicuously large men, who send their coal in gradually, and much more satisfactorily to us than if it came in any other way. There is this thing to be said too that you cannot rely on small men; they must be men of stability. If anything comes in the shape of a check, then your position is awful.

Serjeant SARGOOD: One thing occurs to my mind with regard to your manufacture. We remember what the Chartered Company and you were subjected to with regard to strikes, and I suppose sometimes coalowners may be subject to strikes also. How do they get over that difficulty?

Witness: By simply putting into the contract—and we cannot help ourselves—that during strikes and so on, the whole thing is to be suspended. It is subject always to the strike of the workmen. That used not to be so. If a strike takes place, the coalowners are now exempt from the fulfilment of their contract during that time; and if they were not, what would it come to? Why, that we might come down upon them for large sums of money; but that would not give us coal. We might ruin them, but we do not want to do that. We want them to give us coal.

Serjeant SARGOOD: For the year 1874 you have bought as largely as you prudently thought you could, and you must put up with the chapter of accidents for the remainder of the year, as to which you have made as fair an estimate as you can. You believe that estimate is reasonably fair; and, as far as your contracts have been made, they have been made with prudence and circumspection.

Witness: Yes; I wish it to be understood that, entirely apart from a notion of recklessness as regards the outside public, we have always had that in mind. We do not come here for our own pleasure. Nothing could be more detestable than our having to undergo this inquiry; at the same time, if we apply for fresh capital, we are not the sort of men to lose sight of the duty we owe to the public, as well as to our shareholders. We look upon our business as a strictly commercial undertaking, entered upon with the view, I hope, of making a profit. We should be the happiest men in England if we could supply gas at 2s. 6d. per 1000. Our interest is to make and sell gas at the lowest possible price we can, in order to increase the consumption. That would give us a stability which nothing else could give us. The probable rate of increase in consumption this year is a matter of speculation. It may be 1½ or it may be 3½. My own impression is that the rise in price will have some tendency to prevent the normal increase; but as to pledging myself to any amount I cannot. I was struck with the Chartered Company last year, in their report, assuming that, notwithstanding the rise in price, there would be an increase in consumption of 7 per cent.; which has not been found to be the case. I should say 6 per cent. would be a good increase under ordinary circumstances, and I should think that would be checked by the increase of price. Most people buy less of an article when it is dear than when it is cheap.

Cross-examined by Mr. PHILBRICK: By commercial principles, I do not mean that I am to get as much as I can for myself without any regard for others. I do not say I consider no outlay prudent, which would not result in a diminution in the price. I look at the requirements of the district, and make my outlay accordingly. I should be very unwilling to incur any expense which would cause an increase of price, unless I thought it was necessary for what I may call the immediate future—that is to say, that it would fructify in time.

Mr. PHILBRICK: I understand you to say that this large capital expenditure on the works at Bromley is an expenditure which has happened at an unfortunate period with regard to the price of coal. Where in your estimate for 1874—the great expenditure having been already incurred—is there any income or return for this expenditure of capital in case of the expenditure of 1873? Where do you get the fructification?

Witness: In the gas produced from Bromley.

Mr. PHILBRICK: That is according to the estimate to be produced at a greater loss even than in 1873; where is the fructification?

Witness: You assume that. I do not admit anything of the sort. The gas will be produced cheaper when the coals are cheaper. I do not say they will be cheaper in 1874 while the current contracts are going on.

Mr. PHILBRICK: There is this fact, that there is the large expenditure on capital account. When is that to be fruitful in return?

Witness: If you ask me to fix the date, it is really difficult to say. I cannot tell when the particular money expended on the bridge will be said to fructify. Taking our whole expenditure, it will begin to fructify immediately, and will

do so more and more as more gas is made at Bromley. It is impossible, in commencing works of this sort, to begin them on a very small scale.

Mr. PHILBRICK: Then am I right in supposing that you and your co-directors look to the increased make and sale of gas as being the source whence this outlay on capital is to become ultimately remunerative?

Witness: What are we to look to besides? Not this year, but as years roll on; and if the price of coal rules as was done in 1873, it will be a precious long time before such a thing can take place.

Mr. PHILBRICK: What credit do you give the consumer for the large amount of capital you have expended as compared with the price of gas to him during the year in which we are inquiring?

Witness: It is very difficult to say. It is the commencement of works, and unquestionably during the commencement of the works they are not so productive as they will be hereafter. We are in this position—gas must be supplied, and we are liable to heavy penalties, which your clients would be the first to enforce, if it is not supplied. We are stuffed full at three of our works, and when application is made to the referees about a few grains of sulphur, conditions are imposed on us which reduces our manufacturing power at two of our stations. We must make gas somewhere, and to begin them with a dozen retorts under a tarpauling is childish.

By Serjeant SARGOOD: It is the Metropolitan Board who go to the Board of Trade and insist on this reduction in sulphur. They insist on this expense, and then they come and complain of our starting works to meet their own requirements.

Mr. PHILBRICK: You are not quite accurate in that; because we have no power over the referees?

Witness: I saw a letter from the Metropolitan Board to the Board of Trade, about a year and a half ago, calling attention to the fact that there had been no alteration in the quantity of sulphur as compared with the Act of 1860.

Cross-examination continued: The elimination of 8 or 10 grains of sulphur per 1000 is not worth the expense it costs. Take one of Shoolbred's shopmen, who is exposed for many hours to gas; he does not suffer by the pressure of the 30 grains, instead of the smaller amount, to any material extent. I am speaking in the presence of one of the highest chemists of the time. I have tried the gas at different degrees of sulphur, and I do not believe there is that distinction. At Fulham we have sufficient space for purifying purposes, and that is the reason why, in speaking of the necessity for reducing the power to the purifying capacity, I have mentioned St. Pancras and Shoreditch only. When introducing our bill in 1869, it did occur to me as most desirable that we should take compulsory powers to do those works on the Lea which we had to do; and if you can point out a gas company which has obtained such compulsory powers, I shall be very glad to follow their example. The opening of the dock at Bow Creek was an absolute necessity. At that time we had no idea that the River Lea Commissioners had this control over the foreshore of Bow Creek, and I say, unhesitatingly, that no suggestion of the sort occurred to us. We had to pay £500 for the right; they first asked £1000. They also required a sort of wing wall made; and when we came to make that wing wall, it was found that from the nature of the ground—the natural bank—was so broken, that it was desirable to carry up to a wall which already existed at some sewage establishment. We have such compulsory powers as you get under the Lands Clauses Act, but that is a very different thing from getting special compulsory powers. The reason which I have given against preference capital is a reason which extends to all preference stocks in every company, and that is the reason why no company in a flourishing condition goes unnecessarily to issue preference stock. It is the effort of a beggar to help him over the stile.

Mr. PHILBRICK: It is a question of degree. Supposing there was no guarantee—that it was the question of a trader raising capital for the purpose of extending his business—it would be to his interest to raise money on the most favourable terms to himself.

Serjeant SARGOOD: We may assume that. We have nothing to do with what traders might do, on the judgment of a gentleman who is not a trader.

Mr. PHILBRICK: Supposing the required capital could be raised at less than 7 per cent., it would be to his interest to do so?

Witness: It depends on circumstances. I should think it was doubtful if by so doing he was to prejudice some capital he had already embarked. We have borrowed as much money as we were able. We must exercise our borrowing powers to the full extent before creating fresh capital.

Mr. PHILBRICK: Among the answers to the queries put to the company, there is a statement that "The share capital of £770,665 raised under the Act of 1869 consists of 78,000 shares of £12 10d., and were offered to the registered shareholders at par (in compliance with the 17th section of the Companies Clauses Act, 1863)." Some of those shares were sold in the market—2127—and realized in premiums £2995, which is about £1 7s. 6d. per share; so that in effect the issue of this share capital to your shareholders involved a premium of something over £100,000 to the proprietary by issuing it at par. That is a matter you conceived yourself entitled to divide according to the Act of Parliament.

Witness: Unquestionably.

Mr. PHILBRICK: That capital, supposing it were required for the purpose of the works simply, could have been raised at a less sum than this 7 per cent., and to that extent the public is the loser?

Witness: Parliament gave us the power of raising it either by 7 per cent. ordinary or 6 per cent. preference; and also the power of offering it among the shareholders, which we did, as every other company in England does. We might have subscribed it without taking any per centage at all, and we should have had great credit from the public, if we had been such fools as to do so. It must not be supposed we were established to subscribe for less than that which Parliament says we may have. If I was to do such a thing I should be unfit for my position as chairman of the company. I say it is consistent with due care and management if we raised it at that which Parliament permitted us to raise it at. If the Legislature had chosen to limit it otherwise than they did, they could have done so.

Mr. PHILBRICK: I have here a letter to the secretary of one of the public bodies—St. Pancras—dated November, 1873, which I will read:—"Dear Sir,—I am desired by the directors of this company to state to you, for the information of your vestry, that since the last revision in the price of gas, the cost of coal and other materials, instead of falling, as was then hoped, has become even higher, and the expense attending the manufacture of gas has, of necessity, greatly increased;" so that the application for the revision for raising the price is put there on the expense attending the price of coal and the necessary increase in the price of gas. Now, according to the figures of the company for 1873, if 1870 were no better, that means 3·47d. on every 1000 feet of gas sold?

Witness: I do not know what you are talking about; you are making an assertion to me.

Mr. PHILBRICK: What I want to call attention to is this: so far as the public are concerned, it is put forward that it is the increased price of the production of the article you sell, due to the working and manufacture, and not to the financial operations of the company?

Serjeant SARGOOD: The letter does not say it is dne to the financial operations.

Mr. PHILBRICK: I have here that which you yourself stated to the meeting of proprietors: "At the same time we told the several parishes that we thought it probable, in the face of the rise that had then already taken place in the cost of coal, and the effect it might have on our financial position, that we should be compelled to raise," and so on. How much rise did you attribute to the increased price of the manufacture of the article you sell?

Witness: You have it all in those answers.

The CHAIRMAN: It is rather a matter of inference.

Re-examined by Serjeant SARGOOD: One of the benefits of our having been successful for a length of time is that Parliament gives us the power of issuing certain stock, and getting more than 7 per cent.; and, if we have traded well and successfully, that stock stands at a premium, and is the reward we get for good trading. If we have not been successful, we have a difficulty in getting our stock out. The premium is as much our property as anything can be. I should think the practical difference in the price of gas, whether this stock was issued at 6 or 7 per cent., would be about £10,000 a year, which is very much like ·66d.

Serjeant SARGOOD: The Act of Parliament fixes a maximum dividend. Do you understand that to mean that it was obligatory on the company to take as little as it could in return for its capital, or that it was merely an obligation on the company that it should not take more than it could get under the limitation of the Act?

Witness: Of course, it is based on the assumption that men will get as much in this world as they can, and it limits our power of taking more.

Serjeant SARGOOD: If the Metropolitan Board of Works wish to challenge this idea, that it is the duty of a public company, in the interest of the public and against the interest of the shareholders, to get as little and not as much profit as the Act of Parliament allows them, you are ready to accept the challenge, and abide by what the commissioners think on that proposition?

Witness: Yes.

By the CHAIRMAN: I believe our borrowing powers have been fully exercised up to the present time.

The CHAIRMAN: In the statement of loan capital on the 31st of December, 1873, there is a column headed "Remaining to be borrowed," and in that is the figure £81,250?

Witness: I am not an accountant, but I think I can explain that. We raised the capital in sections; and having raised a section we are at liberty to borrow. We can raise £325,000—a section—and then we can borrow one-fourth of that, which is £81,250, in consideration of the money so raised; then we can raise more, and borrow in proportion to that. Now there remains the sum of £81,250 to be borrowed in consideration of the last call. We might go into the market and borrow that amount, because the capital is subscribed in respect of which it will be hereafter called up.

The CHAIRMAN: What is your opinion about the operation of the Act of 1869, as regards compulsory powers of purchase?

Witness: The gas companies have always been viewed by Parliament with very great jealousy with regard to their compulsory powers. I am not aware that we required any compulsory powers, with the exception of the bridge and the approaches to it, to form which we had to pull down some houses in the Bromley Road.

The CHAIRMAN: You said that the lowness of the price of gas gives security and stability to the company. In what sense did you use that expression?

Witness: I meant that you are not exposed to the agitation which is always going on against a high price for gas. Of course, there are one or two companies which are charging less than we are, which is unquestionably a great security to them. Besides, can any trader do otherwise than wish to supply at the lowest possible price, consistent with his getting proper remuneration?

The CHAIRMAN: You observed on the estimate of increase on the sale of gas, taken by us in our memorandum of last year, that you thought we put it very high in putting it at 7 per cent. Do you know it was founded on the evidence given to us by the chairman of the Chartered Company? He was asked, "Do you anticipate an increase or decrease in the consumption of gas in 1873?" To which he replied, "About 7 or 8 per cent., I think we calculate it, judging year by year." Then I put this to him, "It has been suggested by one of your officers that an increased price may check the consumption?" He replied, "I do not think that parties who have been in the habit of burning a certain quantity will reduce it. I have not found that the alteration in price has made any difference."

Witness: It is not for me to say the commissioners were not fully justified in the conclusion they drew. I only saw your report—I did not know what it was founded upon.

The CHAIRMAN: Is there not a set-off against the economizing of gas in the practice of economizing coal by the use of gas-stoves?

Witness: My experience is that gas-stoves are not popular—they are expensive things, going on burning hour by hour. With respect to the coal contracts, we find it desirable to make those contracts generally about April or May, that being the open time of the year. You must bear in mind that the contractors always ask the right of sending up a portion of the coal during the good months of the year, when the sea is calm, and when they get their ships up in a short time. When you come to deal for the last load, it often happens that you have been squeezed by the last coalowner; you have nothing left but the bad months of the year, and if so you have to pay for it. At one time we used to make contracts for three or four years, but we came to the conclusion that it was a wrong principle, and we only make them now for a year, believing that the residuals to some extent vary with the prime article. As to the improved methods of manufacture of gas, I do not think a suggestion has been made from one end of the kingdom to the other that we have not considered. We examine everything as carefully as possible, and Mr. Kirkham stands as high, as a gas engineer, as any man in England. I most conscientiously say that in everything we have done we have had the interests of the public before us. We believe that every shilling has been fairly and properly expended with a fair and proper regard for a not remote future.

The CHAIRMAN: In the last paragraph of the preamble, and in section 94 of the Act of 1869, it speaks of the expediency of power being conferred on the company which shall conduce to the reduction of the cost of coal and other materials used in the manufacture of gas, and otherwise productive of economy and advantage to the public. Do the directors have regard to those considerations in the exercise of their powers?

Witness: I believe they do. I do not think that a man, because he becomes a gas director, loses his sense of honesty and probity. I lay no claim to infallibility, but I declare, as far as honesty of intention goes, we have most unquestionably exercised it. I cannot tell you offhand when the company first raised new capital under the Act of 1866, but I should say immediately after the passing of the Act, because we wanted money very badly. When we came to Parliament in 1869 no suggestion was made by any human being that the money raised under the Act of 1866 ought to have been raised at 6 per cent. preference instead of 7 per cent. In a good deal of experience, I never heard such a suggestion made with reference to a public company.

By Dr. ODLING: The manufacture of gas at Pancras and Shoreditch—each of them—is, in round numbers, about four-fifths of the quantity manufactured at Fulham.

Dr. ODLING: At present you do not use lime at all except in a subordinate manner at Pancras and Shoreditch?

Witness: Oh, yes! We use lime, but I am not prepared to say in what proportions. Our purification is essentially peroxide purification, and we have been experimenting at Fulham for the purpose of seeing what is the quantity of lime required.

Dr. ODLING: If you are allowed to work within the limit of 30 grains at

Pancras and Shoreditch, you would not on that account have to contract your manufacture?

Witness: We should not have to contract it so much. Everything has been pressed at Pancras and Shoreditch of late years to such an extent as exceeds what good working should be. More competent judges than myself have been there, and expressed their astonishment at the quantity of gas we have got from those places. We want relief there.

By Mr. PATTISON: I can conceive no process a man can undergo much less agreeable than having to come for a revision. I grant there is a certain sort of protection by a revision, but I never expected the day would come that we should be compelled to apply for it.

Mr. PATTISON: If the effect of raising money at 6 per cent. is to diminish the charge of gas to the public, would not your company stand in a better position under revision if they had raised their money on the lowest terms. At present it is £9000 a year?

Witness: Spread over the number of thousands—I have not done the sum—it must be a decimal of a penny. It is for the commissioners to say whether we shall stand better or not.

Mr. PATTISON: I asked you the question because you seemed to imply that the stock itself would be standing in a prejudicial position. Companies of second-rate standing raise money by preference capital. The great railway companies raise money by preference capital when they want to economize—when they wish to leave as much free profit as possible for the ordinary shareholders?

Witness: Heaven forbid I should speak disparagingly of those companies. What I said was unquestionably as to gas companies. I do not think, as far as I recollect, that there is any gas company in London with preference shares—except the London—who, when they raised their preference shares, were not in a flourishing condition; but their ordinary capital was not protected by Act of Parliament, and, therefore, there is no parallel.

Mr. PATTISON: You stated it was convenient to deal with large contractors, so as not to have any confusion in the quantities delivered at one time. Supposing you made 20 contracts instead of one, and by making 20 contracts you could get lower terms, could you not arrange with those 20 to deliver the coals at periods convenient to you?

Witness: If anybody can satisfy me that we can get better terms by making 20 contracts instead of one, we shall be very willing to make them; but I do not think we have ever done otherwise than make good bargains in the way in which we have conducted our affairs.

Mr. PATTISON: I put the question in that form, because it was admitted by your secretary that the smaller companies were able to buy on better terms.

Witness: I think you put a larger construction on his answer than he intended. As I understand it, there are times when you may go into the market and pick up a certain number of ships at temporarily lower prices, and that a small company, living, as it were, from hand to mouth, has an opportunity of doing that, whereas a large company must make their contracts for the year round. I do not understand that, as a rule, they buy their coal cheaper than large companies. I understand that our habit of paying every Friday morning enables us to have the command of the market, and buy coals at the cheapest rate. You must bear in mind that it is not the mere pounds, shillings, and pence per ton; you may have a variation in quality, which makes the cheaper coal in truth the dearer. You may work out of an inferior coal a larger quantity of gas, but it would be of an inferior quality, and you might have to supplement it with cannel, which is very expensive. The Chartered Company, by their Act of 1868, and the Imperial and South Metropolitan Companies, by their Act of 1869, are bound to supply 14-candle gas; but the other companies are not under any such obligation. I cannot say whether they do so as a matter of fact, because their gas is not tested.

Serjeant SARGOOD: Nominally they do, but nobody knows practically.

Mr. CRIPPS: Yes, they do.

Witness: Mr. Cripps says they do, and he seems to know all about it.

Mr. CRIPPS: I speak from evidence; that is all. They may be tested by their own officers, although not by public officers. I am not disposed to run their gas down in any way. I dare say it is excellent.

Dr. ODLING: Do you apply to the commissioners to put an increase on the price of gas in respect of the restriction on the amount of sulphur in the gas made in St. Pancras and Shoreditch during the next year?

Witness: Yes, we do; because the referees, in giving us on the last occasion the margin they did, intimated that they should expect us to employ the interim in doing what we could to satisfy what they call the requirements of the public—that is, to come under 20 grains, or whatever it may be. We can only do that by diminishing the manufacture at those stations; and then comes the question, are you to pull down any of the manufacturing buildings? You may get out of a ton of coal of a given quality a certain amount of illumination; but, whether you take it of a high quality and a small quantity, or a lower quality and a larger quantity, you cannot get more out of a ton of coal than there is in it; and if you choose to have a large quantity of thin gas you must supplement it by cannel, and then it becomes costly to make. We have to consider, in taking the question of coal, what amount of a certain quality it will yield, and the sort of coke it makes; but these and other things are minor considerations.

By the CHAIRMAN: I remember distinctly that no objection was made in 1869 to our raising the capital authorized by our Act of 1866, at 7 per cent. The bill of 1869 was opposed by the Metropolitan Board of Works, as they were in duty bound, no doubt. The option is put in as a matter of course—it is one of Lord Redesdale's forms to put the amount at 7 per cent., or 6 per cent. preference.

Mr. CRIPPS: The words are essentially different. They are that in no case is it to exceed that.

The CHAIRMAN: It is the alternative that is important.

Witness: It is plain enough what is meant. In the same way it is said the illuminating power shall not be less than 14 candles.

The CHAIRMAN: Either the objection was taken or it was not. If it was not taken, then you have drawn your conclusion; if it was taken, the other conclusion may be drawn, that Parliament reaffirmed the propriety of that mode of proceeding.

Witness: I say the objection has been taken to-day in this room for the first time.

Mr. CRIPPS: This is the first inquiry into the care and management of the company.

Witness: It has nothing to do with that.

Serjeant SARGOOD: Under the old Standing Orders the ordinary proportion of borrowing powers was one-third of the whole capital?

Witness: Yes. Formerly the borrowing power was the same as the railway companies, but now, for some reason or other, the railway companies have the power of borrowing 33 per cent., and we have only the power of borrowing 25 per cent.

Serjeant SARGOOD said that was the case for the Imperial Company.

After a brief conversation, in the course of which the CHAIRMAN said the commissioners intended to pay a visit to the works, the inquiry was adjourned till Thursday, Feb. 27.

INSTITUTION OF CIVIL ENGINEERS.

ON THE WATER SUPPLY OF THE CITY OF DUBLIN.

At the Meeting of the Institution on Tuesday, Feb. 24—THOS. E. HARRISON, Esq., President, in the chair—a paper on the above subject was read by Mr. Parke Neville, M. Inst. C.E. The writer said:—

The water supply to the city of Dublin was for several centuries derived from the river Dodder. In 1775 this source was found to be insufficient, and the corporation entered into contracts with the then Grand Canal Company for a supplemental supply. In 1808 they made new contracts, for a term of sixty years, with the Grand and Royal Canal Companies, for a supply equal to from 6 to 7 million gallons per day. Under the terms of this contract, the city was mainly supplied up to the time when the Vartry water was introduced. The level of the water in the old city basins, from which the canal and Dodder waters were distributed, was only from 76 feet to 78 feet above Ordnance datum, while some portions of the city of Dublin were on an elevation of about 100 feet. The water, also, was hard and subject to pollution. From 1850 to 1857 the question of obtaining a better supply was constantly under consideration. The plan most advocated was to take water from the canals from a high level, and to construct a large distributing reservoir; but the corporation, after promoting a bill in Parliament to obtain a supply from the river Liffey, near Newbridge, called the Coyford scheme, ultimately agreed that the whole question should be referred to a Royal Commission, and Sir John Hawkshaw, Past President Inst. C.E., was appointed by the Government as commissioner. He held an inquiry in Dublin, in October, 1860, and examined into the merits of all the schemes, the result being that he recommended the river Vartry as the best source. In the session of 1860-61 an Act was obtained for carrying out the works in accordance with the Royal Commissioner's report, and the works were commenced in November, 1862, and finished in 1868.

The source of the river Vartry was at the base of the Sugar Loaf Mountain, in the county Wicklow; and it flowed in a southerly direction, through a thinly-populated country, into the sea at the town of Wicklow, being a distance of about 17½ miles. The geological character of the country was clay slate. The water flowing off the catchments was peculiarly soft and pure, and, by analysis, was found to be almost identical in character with the Loch Katrine water with which Glasgow was supplied. The rainfall over the district, from observations during the past thirteen years, varied from 40 inches in depth, in 1873, the driest year, up to 60·87 inches, the greatest rainfall registered; the average might be taken at about 50 inches.

The place selected for the storeage reservoir was near the village of Roundwood, about 7½ miles below the source of the river. The bed of the river at that point was 632 feet above Ordnance datum, and the drainage area above it was 14,080 acres. The embankment across the valley was at the deepest point 66 feet high, and it was 1640 feet long on the top. The greatest depth of water impounded was 60 feet, and the average depth 22 feet. The area of the reservoir was 409 acres, and it was capable of holding 2400 million gallons of water, equal to 200 days supply for the city of Dublin and suburbs, taking the population at 400,000, and allowing 25 gallons per head per day for domestic and public use, and 2 million gallons for manufacturing purposes. The level of the water in the reservoir, when full, was 692 feet above Ordnance datum, and 580 feet above the highest parts of the city of Dublin. The corporation had acquired by purchase all the water rights of the millowners and riparian owners; accordingly no compensation water had to be given, the entire property in the water being vested in the corporation. The quantity of the rainfall discharged over the bye-wash was about two-fifths of the entire fall, so that by constructing additional reservoirs the storeage would be increased 60 per cent.

Two mains, 48 inches and 33 inches in diameter respectively, were carried through the bank in a tunnel excavated out of the rock and arched over. The 48-inch main, which terminated in the bye-wash, was a provision solely for the purpose of being able rapidly to lower the water in the reservoir, if necessary. The 33-inch main conveyed the water to a circular receiving basin, situated at the outer toe of the embankment, and from this basin the water was distributed by side canals on to seven filter-beds. After being filtered the water was collected into two pure-water tanks, from whence it was carried for about 700 yards in an iron pipe, 42 inches in diameter, with a fall of 6 feet per mile, until it reached the tunnel, into which it was laid for 120 yards. The tunnel was 4367 yards long, and conveyed the water from the natural valley of the Vartry, under a range of hills separating that valley from the districts sloping towards the sea to the east. The natural course of the Vartry was from north to south, but by curves in the tunnel it had been turned to flow north towards Dublin. This tunnel was extremely difficult to execute, from the character of the rock bored through and the quantity of water met with. It was from 5 feet to 6 feet high and 4 feet wide. To facilitate its execution 21 shafts were sunk, varying from 90 feet to 180 feet deep. The gradient of the tunnel was 4 feet in a mile. At Callow Hill, the northern or Dublin end of the tunnel, there was a circular relieving-tank, 90 feet in diameter, and a gauge-weir for registering the quantity of water flowing into the city. From this tank, the surface water in which was 602 feet above Ordnance datum, a main, 33 inches in diameter, conveyed the water to the distributing reservoir at Stillorgan, a distance of about 17½ miles. There was a self-acting stop-valve at the junction of the main with the tank, to prevent flooding in case of a pipe bursting. Three tanks relieved the pressure at different points—viz., at Kilmurray, level above datum, 472·2 feet, distance from Callow Hill, 11,809 yards; at Kilcroney, level above datum, 414 feet, distance from Kilmurray, 5121 yards; and at Rathmichael, level above datum, 341 feet, distance from Kilcroney, 6444 yards, which latter was 7431 yards from the Stillorgan reservoir. At each of the tanks there was a self-acting drop-valve, to shut off the water in case of a pipe bursting. The pipes had been laid for 9894 yards along the public roads, and the rest, 21,048 yards, across the country, which, for part of the distance, where the Dargle River, the Cookstown Valley and the County Boundary Valleys had to be crossed, was of a difficult and rugged character.

The two distributing reservoirs at Stillorgan were 4 miles 5 furlongs 150 yards from the city boundary at Eustace Bridge. The top water-level in the upper one was 274 feet above Ordnance datum; it contained 43,057,414 gallons, and was of the average depth of 20 feet. The lower one was 271 feet above Ordnance datum, or about 250 feet above the quays in Dublin, and contained 43,166,548 gallons, the average depth being 22 feet. The total quantity of land occupied by the reservoirs, caretakers residence, &c., was about 26 acres. At the south-east corner of the lower reservoir there was a handsome screen chamber, of ashlar granite, octagonal in plan, and 49 feet in internal diameter; the depth of the water was 27 feet, and to the floor line 31 feet 6 inches. The pillars and framework were of cast iron, and the screens had an area of 1500 square feet, and were fitted with copper wire gauze having 30 strands to the inch. Seven 33-inch valves, two 27-inch valves, and one 15-inch valve in this chamber regulated the distribution of the water. There was also a scour-pipe and valve 12 inches in diameter, and the overflow was through a vertical pipe, 27 inches in diameter, with a bell mouth. The valve gearings were all fixed to the side walls, leaving the centre of the chamber quite clear. All the valves in this chamber and on the large mains were worked by slow-motion gearing, to prevent the possibility of closing or opening them too rapidly; and indices, graduated to inches and turns of the screws, were attached to all to secure accuracy in working. Two mains, 27 inches in diameter, conveyed the water from the screen chamber to the

boundary of the city at Eustace Bridge. They were carried through the embankment of the reservoir in a culvert. At the toe of the embankment a vaulted chamber was built, in which self-acting stop valves were placed. The mains were carried along the Stillorgan Road. At Merrion Avenue, at Simmins Court, and at Eustace Bridge, groups of valves, in vaulted chambers of easy access, enabled the water to be turned from one main to the other, so that in case of accident a short section of the injured main could be emptied for repair without interfering with the supply to the city; and at those points also branches were taken off for the supply of the Pembroke and Blackrock townships. On the city side of Eustace Bridge, at Leeson Street, the 27-inch mains separated right and left, and were carried through the streets (being gradually diminished in size to 18 inches) until they were united on the north of the city, forming a zone encircling the central parts of the city, and from this zone all the service-mains diverged. Screw valves at the intersection of the streets enabled the water to be turned off or on, either to repair the mains, or to concentrate the pressure in case of fire. Hydrants were placed in every street at intervals of 100 yards, and the system was so perfect, that since the introduction of the Vartry water no steam or hand fire-engine had been used to extinguish fires. The supply of water at high pressure, to be obtained from the mains by simply attaching a stand-pipe, with hose, &c., to the hydrants, had proved sufficient to throw powerful jets of water over and on to the highest building, rapidly extinguishing fires and preventing them from spreading. A length of 51 miles of new mains had been laid within the city boundary, and 60 miles of the old mains had been utilized. The number of hydrants was 1219.

The corporation supplied water in bulk to eight extra municipal townships viz., Pembroke, Blackrock, Kingstown, Dalkey, Ballybrack, Bray, Kilmainham, and Clontarf, for which they were paid at the rate of from 3½d. to 5½d. in the pound on the valuation of the townships; the quantity of water the corporation were bound to supply being at the rate of 20 gallons per head of population per diem.

The total cost of the works, including every item for compensation, purchase of lands, law and parliamentary charges, also the old pipe-water debt of £72,000, had been £610,000, or at the rate of about £1 16s. 6d. per head of the population.

THE NORTHERN COAL TRADE.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the north-eastern district continues to sympathize with the market throughout the country, and shows no more symptoms this week than last, or the weeks of February and January which went before them, of any revival. The household trade on the Tyne and Wear is very depressed. There are no orders, either foreign or home, and a fair class of coals is offered at from 15s. 6d. to 16s. per ton, which is the lowest price to which they have fallen these two years. And these low rates do not bring business. The gas coal trade is rather unequal, but as a rule it is not very animated. Prices are unchanged. Steam coal has been a shade firmer, but very poor business is being done by the leading collieries; and second-class pits have to put up with prices ranging from 15s. 6d. per ton upwards. And when it is mentioned that best steam coals were selling at 25s. per ton at one period of last year, it will be seen that this class of coals is coming down considerably. Of course there is a rest beyond which coals cannot fall without deranging trade. The tendency of prices is still downward, and the rest has not been reached yet; this seems to be the opinion of most experienced men upon Newcastle Quayside. Hence every one is hanging back who can. Business, as a rule, was weaker in the Cleveland iron trade last week. But even in this trade there must be a good margin for a fall when large concerns in the iron trade which have collieries also, and work the two together for the benefit of the shareholders, can declare a dividend equivalent to 21¾ for the year ending December, 1873, as Messrs. Bolckow and Vaughan and Co., Limited, have done. The Darlington Iron Company even exceeds that; they have declared a dividend equal to 28 per cent. per annum. Of course there are many iron companies in no such favourable position, but in many instances this is on account of not having had collieries of their own, and showing that large profits must have been made upon the latter class of property last year. In fact, there is no doubt that 1873 was the most profitable year ever known in the coal trade. The reason for this was, that nearly all the collieries got quit of low contracts last year which had run out, and were enabled to bring more coals into the open market and partake of the advance. The chemical business does not improve. The restrictions placed upon the manufacture of goods have not tended to advance prices, or bring orders into the market. All classes of shipping freight keep low; 5s. 9d. per ton is the rate to discharge at wharf or in the river, at London; 4s. 9d. to Yarmouth and Lowestoft and the east coast; £8 5s. per keel to the nearer ports of France, and £8 15s. to the English Channel ports. Labour is becoming more abundant in the north, and fewer men are coming from the south to go into the factories.

LEOMINSTER GAS AND COKE COMPANY, LIMITED.—The twenty-first half-yearly general meeting was held on the 19th ult.—Mr. T. B. Stallard in the chair. The report of the directors stated that the company being now subject to the provisions of the Gas-Works Clauses Acts of 1847 and 1871, it had become necessary to alter the form in which the accounts had usually been presented, to the more elaborate one prescribed for companies obtaining statutory powers. It was also requisite that they should be made out for the year ending December 31, and the annual statement would, in future, be printed at that date. During the last half year there had been a small decrease in the consumption of gas by private consumers, to the extent of 41,600 feet, and the advances in the price of gas and residuals had not fully covered the increased cost of coal. There was, however, reason to hope that the price of this important article was tending downwards, though perhaps slowly. The amount voted at the last general meeting of shareholders as an acknowledgment to the directors for their past services, has been paid out of the last account, to which, on the other hand, has been added sums retained for doubtful debts and taxes, which proved to be no longer required. The balance of the profit and loss account was £292 18s. 6½d., out of which the directors recommended that a dividend be declared for the past half year at the rate of 8 per cent. per annum on the original shares, and 7 per cent. per annum on the "B" shares from the time at which the calls were paid, being 8s. and 2s. 9d. per share respectively. This would absorb £234 7s. 6d., and leave £58 11s. 0½d. to be carried to the next account. Four additional public lamps have recently been put up at the request of the local board. The directors had decided to give notice to terminate the contract for the lighting of the public lamps, on the 30th of June next, as they considered that, in justice both to their shareholders and to the private consumers, some revision of the extremely low rates now charged must be made. The photometer was now complete, and the testings showed the illuminating power of the gas to average fully 16½ candles. This result was highly satisfactory to the directors, and should be equally so to the gas consumers. Notwithstanding the high price of coal and other articles required in the manufacture of gas, the company were now supplying gas more than two candles in excess of their standard, at 10d. per 1000 feet below the maximum price. The statistics of gas companies, recently published in the JOURNAL OF GAS LIGHTING, showed that this company was not surpassed in these respects by any one of similar extent in the kingdom, and only by comparatively a few of the larger companies.

Share List,

OF

Metropolitan Gas and Water Companies.

(*Corrected by Mr.* F. N. GOLDING, *Sun Court, Cornhill, from the latest Stock Exchange Quotations.*)

Number of Shares issued.	Amount per Share.	Name.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£	GAS COMPANIES.	£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	14 — 16
5000	20	Bahia (Limited)	20 0 0	3 0 0	11 — 13
1000	20	Do., preference	20 0 0	10 0 0	25 — 27
750	20	Do., do., redeemable	20 0 0	10 0 0	20 — 22
40000	5	Bombay (Limited)	5 0 0	6 15 0	5¾ — 6¼
10000	5	Do., fourth issue	4 0 0	6 15 0	⅜—1 pm.
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge., and Holywell.)	20 0 0	10 0 0	34 — 36
7500	20	Cagliari (Limited)	20 0 0	7 0 0	15 — 17
180000	10	*Chartered* A ordinary	10 0 0	10 0 0	15⅝— 16
25000	10	Do. A, 5 per cent. preference	10 0 0	5 0 0	13½— 14
20000	10	Do. A, 5 per cent. do., 2nd issue	10 0 0	5 0 0	13½— 14
30000	10	Do. A, 5 per cent. do., 3rd issue	10 0 0	5 0 0	
10000	10	Do. B, 4 per cent. maximum	10 0 0	4 4 0	7 — 7½
20000	10	Do. C, 10 per cent. preference	10 0 0	10 0 0	19½— 20
12000	25	Do. D, 10 per cent. preference	25 0 0	10 0 0	49 — 50
448875*l.*	Sk.	*Commercial*	100 0 0	10 0 0	159 —161
20000	20	Continental Union	20 0 0	8 0 0	20½ — 21½
20000	20	Do., new	12 10 0	8 0 0	¾—⅞ pm.
10000	20	Do., preference (Grmny.: Strsbg. France: Cette, Nismes, Montargis Vienne, Roanne, Beaucaire, Rueil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	24 — 26
5000	10	*Crystal Palace District*	10 0 0	10 0 0	15½— 16
5000	10	Do., preference	10 0 0	6 0 0	11¼— 12
1000	10	Do., new shares	10 0 0	7 0 0	11½— 12
23405	10	European (Limited)	10 0 0	8 0 0	17 — 18
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	7 10 0	8 0 0	6 — 7
4054	10	Foreign and Colonial (Limited)	10 0 0	..	9 — 10
5000	10	Hong Kong (Limited)	10 0 0	10 0 0	13¼— 13½
1560000	100	*Imperial*	100 0 0	10 0 0	157—159xd.
78000	12½	Do., new shares	12 10 0	7 0 0	15—15½ xd.
2600	12½	Do.	5 0 0	7 0 0	6½—7 xd.
1300	100	Do., bonds	£100	10 0 0	195 —200
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Frankfort-on-Maine, Haarlem, Stolberg, and Vienna.)	43 15 0	9 2 6	53 — 54
3000	40	*Independent*	40 0 0	10 0 0	64 — 66
3000	10	Do.	10 0 0	5 0 0	8 — 9
3000	20	Do.	20 0 0	7 10 0	24½— 25½
4500	10	Do., D	3 0 0	10 0 0	7⅞— 8½
378350*l.*	Sk.	*London*	100 0 0	10 0 0	158 —160
150000*l.*	Sk.	Do., 1st preference	100 0 0	6 0 0	117 —120
14450	Sk.	Do., 2nd preference	100 0 0	6 0 0	
4350	Sk.	Do., 3rd preference	100 0 0	6 0 0	
7622	25	Do., A shares	12 10 0	6 0 0	
26805*l.*	All	Do., Debenture stock	100 0 0	5*l.* & 6*l.*	
15000	5	Malta and Mediterranean (Limited)	5 0 0	5 0 0	2¼— 2⅝
6000	5	Do., preference	5 0 0	7 0 0	5 — 5½
20000	5	Mauritius (Limited)	2 0 0	7 0 0	2 — 2½
25000	20	Monte Video (Limited)	20 0 0	..	23½— 24½
8000	10	Nictheroy, Brazil (Limited)	10 0 0	..	
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6½— 7
30000	5	Do., new shares	2 10 0	9 0 0	¾— 1
10000	5	Ottoman (Limited)	5 0 0	nil.	1¼— 2½
17500	10	Parà (Limited)	10 0 0	7 0 0	7 — 8
27000	20	*Phœnix*	20 0 0	10 0 0	32 — 33
360000*l.*	100	Do., new	55 0 0	7 10 0	69 — 71
144000*l.*	Sk.	Do.	100 0 0	5 0 0	22 — 94
5000	20	*Ratcliff*	20 0 0	10 0 0	31½— 32½
36000	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	32½— 33½
7359	5	Singapore (Limited)	5 0 0	7 10 0	4½— 5
2000	5	Do., preference	5 0 0	7 10 0	5½— 6
1500	32½	Shanghai	32 10 0	12 0 0	30 — 32
4000	50	*South Metropolitan*	50 0 0	10 0 0	85 — 87
4000	12½	Do.	12 10 0	10 0 0	20½— 21½
20000	12½	Do., new shares	5 0 0	10 0 0	9½— 10½
15000	10	*Surrey Consumers*	10 0 0	10 0 0	15½— 16
10000	10	Do., new	7 0 0	10 0 0	4½— 5½
9000	4	United General (Limerick)	4 0 0	2 10 0	2 — 2½
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	14 — 15
1500	10	Do.	10 0 0	7 10 0	11 — 12
2957	10	Do.	10 0 0	7 0 0	
993	10	Do.	3 0 0	7 0 0	
16000	5	*West Ham*	5 0 0	10 0 0	7¾ — 8
10000	5	Do., new shares	2 10 0	10 0 0	— 4
		WATER COMPANIES.			
60000	10	Berlin	10 0 0	11 10 0	20 — 22
12000	100	Chelsea	100 0 0	6 0 0	118 —120
1800000	100	East London	100 0 0	6 0 0	121 —123
8000	50	Grand Junction	50 0 0	8 10 0	74—76 xd.
5840	25	Do., ½ shares	25 0 0	8 10 0	36½— 37½
2160	25	Do., new do.; maximum dividend, 7½ per cent.	25 0 0	7 10 0	31 — 33
4396	100	Kent	100 0 0	6 0 0	121 —123
5339	100	Lambeth	100 0 0	6 5 0	121 —123
1161	100	Do.	20 0 0	6 5 0	
442	100	New River	100 0 0	8 0 0	
4443	100	Do.	30 0 0	8 0 0	36 — 38
400000	100	Do., debenture stock, 4 per cent.	100 0 0	4 0 0	97— 99
3036	100	Southwark and Vauxhall	100 0 0	5 10 0	98— 100
1296	100	Do., preference stock	100 0 0	5 0 0	101— 103
	100	Do., D shares	100 0 0	5 10 0	98— 100
		Do.	..	4 10 0	
	100	Do., new ordinary	..	4 10 0	
1600	100	Do., new ordinary, No. 1	40 0 0	4 10 0	
12172	61	West Middlesex	61 0 0	£6 per sh.	119—121

THE TONBRIDGE DRAINAGE SCHEME.—GOVERNMENT INQUIRY.—The adjourned Government inquiry was held at the Town-Hall, Tonbridge, on the 13th ult., before Mr. Arnold Taylor, respecting the further borrowing of £3000 to complete the Tonbridge Drainage and Irrigation Scheme. The application was supported by Mr. G. D. Warner, the solicitor to the local board. It should be stated that the local board have adopted a scheme propounded by Mr. Charles Jones, civil engineer, of Ealing, which includes precipitation, deodorization, and filtration. The original contract was £8781 3s., but it being found necessary to extend the main drainage beyond the limits contemplated, and the connexions being made by the town, £13,000 has been expended, and an application for £3000 more formed the basis of the present inquiry. This amount was required to complete the drainage and put some land under irrigation. This land belonged to a charity, and the trustees—the town wardens—have leased it to the town. As Mr. Jones had pledged himself to his scheme of filtration being complete in itself, the proposal to put this land under irrigation has met with very considerable opposition. On Friday, Mr. Julian Goldsmid, M.P. (who owns a large tract of land in immediate proximity), attended and stated his objections. First, he objected to the action of the local board in spending money on irrigation works without the authority of the ratepayers, and this after it had been stated by Mr. Jones that the filtration works were complete in themselves, and that they did not require the assistance of any other system. Upon the strength of that statement the ratepayers felt satisfied, and had no objection to the £10,000 being borrowed, because they were told they would have not only the cheapest but the best sewage works. But to their intense astonishment, and in a most irregular manner, there had been a private inquiry, of which, of course, no public notice had been given. His contention was, therefore, that the proceedings which took place at that inquiry were irregular. The inspector said it was perfectly open for the local board to turn to any system before calling the ratepayers together. The local board had made application for £3000, had set out what they wanted it for, and he attended for the purpose rather of satisfying the Local Government Board that the money would be spent in a proper manner. They treated the local board as representing the ratepayers and as trustees of their money. Mr. Goldsmid: You assume that they have that power. I say they have not. The Inspector: It is not for the Local Government Board to say to the local board, "Have you consulted the ratepayers?" I understand if I do not order a public inquiry it is because the London board do not think there is any necessity for one. He next read the report he made of the private inquiry, and explained that it was because Mr. Jones desired to procure this land for irrigation purposes. Mr. Goldsmid still contended that the inquiry should have been public. The inspector said that the matter of a public inquiry was not provided for by Act of Parliament, although the Local Government Board generally ordered one. Mr. Goldsmid said he had had something to do with the framing of these Acts, and he could say that the general object was to prevent local boards doing things and spending money, which the ratepayers did not approve of, without the knowledge of the ratepayers. He believed £4500 at least would yet be required to complete the proposed scheme, and this after Mr. Jones had reported that his filtration scheme was perfect in itself. The inspector did not think it would require so much. Mr. Goldsmid next objected to the land being irrigated, because the approach road was private property, and that the public had only a right of way on foot over it. The local board had also laid down pipes on his property without giving notice. Mr. Warner said he was quite prepared to admit that they had no right to go on the property without giving notice; and Mr. Rogers (a member of the board) said it was Mr. Jones's fault. Mr. Goldsmid added that he wrote to the contractors on the subject, and as they told him they did the work according to the instructions of Mr. Jones, he wrote to the local board, and two days afterwards he received from the clerk a letter stating that it was an omission on the part of Mr. Jones, and enclosing a ten days notice—after the work had been done. (Laughter.) He next pointed out that the lease of the land had only 21 years to run, with the option of purchase, subject to the approval of the Charity Commissioners, who had informed him that the proceedings of the Town Wardens in handing the land over to the town were irregular, and that the lease was *ultra vires*. Next he complained of the two ponds for the effluent water, which would overflow upon his land. This, he could foresee, would entail the expenditure by the town of some thousands of pounds, and most probably a Chancery suit. Mr. Warner having replied, the land and sewage works were visited.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

643.—TRUEMAN, H. P., Woodbridge, Suffolk, "Improvements in apparatus for measuring liquids." Feb. 20, 1874.

653.—SCOTT, H. Y. D., Ealing, Middlesex, "Improvements in the treatment of sewage and in the manufacture of manures therefrom." Feb. 20, 1874.

662.—WEST, D. K., Kentish Town, Middlesex, "Improvements in engines to be driven by water and steam, and in pumps." Feb. 21, 1874.

679.—LAKE, W. R., Southampton Buildings, London, "Improvements in air-tight joints for gas-retorts." A communication. Feb. 23, 1874.

697.—BRAIDWOOD, J. P., Phœnix Gas-Works, Bankside, Surrey, "Improvements in apparatus for securing the lids or covers of gas and other retorts." Feb. 24, 1874.

702.—WESTON, J. H., Lansdowne Road, Surrey, "Improved means of and apparatus for purifying, carburetting, and increasing the illuminating power of coal gas." Feb. 24, 1874.

717.—ROBINSON, A. H., Merrion, Dublin, "Improvements in meters for measuring water and other liquids, and in motive-power engines, parts of such improvements being also applicable to flushing water-closets and preventing waste of water." Feb. 25, 1874.

720.—WOODCOCK, J., Plymouth, "Improvements in valves for regulating the supply of water to cisterns or tanks." Feb. 25, 1874.

GRANTS OF PROVISIONAL PROTECTION.

531.—JOHNSTON, W., Lima, Peru, "Improvements in machinery or apparatus for compressing air or gases." Feb. 11, 1874.

565.—HAZELDINE, F., Borough, Surrey, "An improved valve or tap for liquids and other purposes." Feb. 14, 1874.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

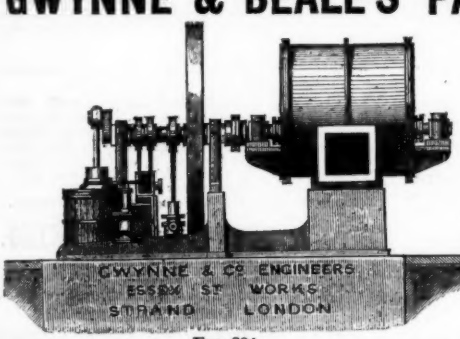


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

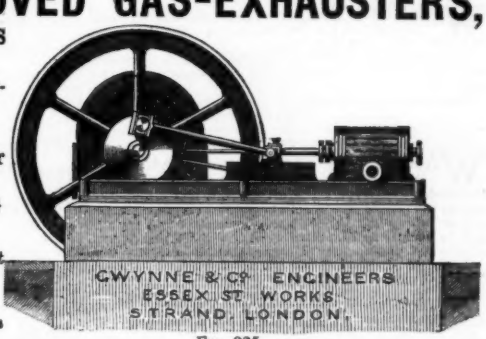


FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND CO. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,
CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

GAS MAKER, &c.

WANTED immediately, an active man to make and distribute, set retorts, be a good fitter, and do all requisites for a small Gas-Work in a sea-side watering-place, south coast of Devon.
Address, with terms and references, to J. D., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Working MANAGER in a small Gas-Work. Understands the manufacture and distribution of gas, also laying mains, services, fixing and taking indices of meters. Has a little knowledge of gas-fitting. Good reference.
Address W. F. C., 17, Cross Street, WINCHESTER.

TO GAS COMPANIES AND GAS-FITTERS ABROAD.

WANTED, by a tradesman and his son, aged respectively 42 and 20 years, an engagement for three years, as Gas-Fitters, or Manager and Foreman to Gas-Fitters. Over 20 years fitters to The Gaslight and Coke Company.
Address R. B., 20, Baxter Road, Essex Road, ISLINGTON

WANTED, by a plumber and gas-fitter, a situation as FOREMAN or MANAGER of a small Gas-Work. Thoroughly experienced in the laying of mains and service-pipes, also the general workings of a Gas-Work. Good references.
Address R. H., 49, King Street, STIRLING.

WANTED, by a young man, a situation as Meter Fixer, Fitter, Index Taker, &c.
Address F. H., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a practical man, a situation as MANAGER of a Gas-Work, where the make is from 10 to 30 millions. Uses the photometer. Unexceptionable testimonials as to character and abilities.
Address G. L., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a respectable man, an engagement as WORKING MANAGER. Home or abroad. Can set retorts and do general repairs. Twenty years in last situation. Aged 42.
Address T. H., 6, Acre Place, New Road, BATTERSEA.

WANTED, a situation as Main-Layer, Service-Layer, or Meter-Fixer, or to take charge of small works. No objection to go abroad.
Address G. SIMMONDS, 13, Clement's Road, Bermondsey, LONDON.

TO GAS FOREMEN.

WANTED, for a Gas-Work abroad, a thoroughly competent GAS FOREMAN.
Address, with terms and references, to SECRETARY, British and Foreign Water and Gas Works Company, Limited, BARTHOLOMEW HOUSE, E.C.

WANTED, for South America, an ASSISTANT ENGINEER for Water-Works. Salary £360 per annum. Five years engagement, and passage out and home. One would be preferred who, having been brought up with a Civil Engineer or with a manufacturing firm of Hydraulic Engineers, has had some experience with earthwork, main-laying, and domestic fittings.
Address N. W., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COOKING AND HEATING BY GAS,
BY
MAGNUS OHREN, A.I.C.E.

GAS *versus* COAL.
Pamphlet for Gas Companies to circulate amongst their gas consumers to increase day consumption, &c.
Specimen Copy by post 4d., direct from MAGNUS OHREN, Gas-Works Lower Sydenham, London, S.E.

VINCENT'S
PATENT IMPROVEMENTS
IN
Apparatus for Manufacturing Gas.
Particulars to be obtained by application to—
MR. LAYARD JONES,
ENGINEER,
25, OLD BROAD STREET, LONDON, E.C.

WANTED, a practical Gas Engineer and Manager to act, on behalf of a Gas Company abroad, as CLERK OF THE WORKS, during the erection of entire new works, and to remain in charge as Manager on completion. Salary £250 for the first year, with good dwelling-house, and a per centage on the profits.

Forward copies of testimonials, stating age, &c., to Box 14, Post-Office, BIRMINGHAM.

WANTED.—The Directors of the Belper Gas and Coke Company require the services of a MANAGER for their works. He must be thoroughly conversant with the manufacture and distribution of gas, setting retorts, main and service laying, and the general routine of a Gas-Work, together with the book-keeping and collection of accounts from the consumers. He will be required to devote the whole of his time to the duties of his office, and give security to the amount of £200.

Applications, enclosing testimonials and references, stating age, where at present employed, and salary required, addressed to the Chairman, must be sent in to me at the Gas Company's Offices, on or before the 9th day of March next. W. B. WHITAKER, Manager.

Feb. 17, 1874.

FOREMAN RIVETER Wanted, to go to Peru to ERECT one or more TELESCOPIC GASHOLDERS. Must be experienced.

Address, with particulars of present or former employers, to E. S., care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

DRAUGHTSMAN, experienced, Wanted, accustomed to drawings of Gas-Works. One with a practical knowledge of Gas-Works construction preferred. Salary £105 and upwards, according to qualifications.

Apply, prepaid, with full particulars, Box 14, Post-Office, BIRMINGHAM.

MAINS FOR GAS-WORKS.

WANTED promptly, f.o.b. Glasgow, 300 tons, assorted, 2 to 6 in.; and 30 tons 8 in.

Quote lowest price to Box 14, Post-Office, BIRMINGHAM.

GAS-MAINS.

WANTED, in April, or earlier, about 500 tons, f.o.b. Glasgow, Liverpool, or London, assorted, 2 to 6 in.

Apply, prepaid, with lowest cash price, to CONTRACTOR, 38, West Smithfield. LONDON, E.C.

WANTED to purchase, 5000 to 10,000 tons of GAS COKE. Waggons can be sent to any station for any proportion of above.

Address G. J. EVESON, Gas Coal and Coke Merchant, STOURBRIDGE.

CORPORATION GAS-WORKS, DARLINGTON.

WANTED, Tenders for making and erecting Two Wrought-Iron HYDRAULIC MAINS, each about 70 ft. long.

Particulars can be obtained on application to the undersigned, to whom tenders must be sent on or before the 14th inst.

The lowest or any tender not necessarily accepted.

W. B. EMMERSON, Engineer.

TO WORKING FOREMEN.

WANTED, by the Bangor Water and Gas Company, a WORKING FOREMAN, who thoroughly understands the manufacture and distribution of gas, the setting of clay retorts on the best principle, and can lay mains and service-pipes, fix meters and fittings, and do everything connected with Gas and Water Works. Wages 30s. per week, with house, coal and gas, &c., free.

Apply to D. WHITE, Water and Gas Works, Bangor, NORTH WALES.

GASHOLDER FOR SALE.

THE Lanark Gas Consumers Company, Limited, invite OFFER for the purchase of a single GASHOLDER, 50 ft. by 18 ft. (erected new 12 years ago), with five columns, girders, 6-in. inlet and outlet pipes, 8-in. regulator-valve, and 150 yards of 8-in. pipes.

Also a HYDRAULIC MAIN, 18 in. diameter, in three lengths of 6 ft. 6 in. each, flange joints, with 4-in. flange dips, and 6-in. outlet top and end. Two standards.

The Directors will not bind themselves to accept the highest or any offers.

TO GASHOLDER MAKERS.

TENDERS required for new Gasholder, 26 ft. by 14 ft., with counterbalance, inlet and outlet pipes, valves, foundation bolts and plates. Top sheets, 12 gauge; side sheets, 14 gauge.

TO GAS-METER MAKERS.

WANTED, a thoroughly competent Man to Repair wet and dry Gas-Meters. Accustomed to use test holder. State wages required, where last employed, with references, to the undersigned.

Particulars to be obtained from, and offers sent to,

L. MONK, Manager.

Gas-Works, Lanark, N.B., Feb. 28, 1874.

GAS Companies or Owners of Gas-Works wishing to LEASE their works to pay a FAIR DIVIDEND, will oblige by sending particulars, addressed to A. B., care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

FOR SALE, and ready for immediate delivery by the Barnstaple Gas Company, about 35 ft. of 12-in. Hydraulic Main, in five lengths; 15 ft. of 16-in. Hydraulic Main; cast-iron Stools for ditto; 21 15-in. Mouthpieces; a number of Ascension-Pipes, Bridges, and Dips; together with a quantity of odd castings suitable for a small work.

Feb. 26, 1874.

TO TAR DISTILLERS AND OTHERS.

THE Stratford-upon-Avon Gas Company are prepared to receive TENDERS for the whole of their GAS LIQUOR and surplus TAR to be disposed of from their works by boat or rail, from March 25, 1874, to March 25, 1876.

Tenders to be sent to the Manager, HENRY CRANMER, Gas-Works, STRATFORD-UPON-AVON.

Feb. 19, 1874.

CORPORATION GAS-WORKS, BARROW-IN-FURNESS.

FOR SALE—A set of Four Dry Lime PURIFIERS, 8 ft. square, four layers (wood sieves) in each, galvanized iron covers, hydraulic centre-valve, with 9-in. connexions, and lifting crane complete.

Also TWO CAST-IRON SCRUBBERS, 18 ft. high by 4 ft. diameter, top platform, with wrought-iron railings, wrought-iron ladder, 9-in. connexions, including four Donkin's valves complete.

The above are in good working order, and are only disposed of in consequence of enlargement of works.

An inspection of the above plant, and offers to purchase, will be duly considered. JOHN LEWIS, Manager.

Feb. 5, 1874.

TAR AND AMMONIACAL LIQUOR.

THE Macclesfield Corporation Gas Com- mittee are prepared to receive TENDERS for their TAR and AMMONIACAL LIQUOR for a term of One, Two, or Three years.

The Tar, &c., to be removed from the works by the contractor.

Tenders to be in by the 1st of April, 1874.

For further information apply to the Manager.

The Committee do not bind themselves to accept the highest or any tender.

Feb. 16, 1874. JOHN HENRY LYON, Manager.

BOROUGH OF SALFORD.

THE Gas Committee is prepared to re- ceive TENDERS for a quantity of CANNEL, to be delivered on their works, situate at Lamb Lane, Regent Road, and Liverpool Street, Salford.

Particulars and forms of tender can be had from the Manager, at his Office, Gas-Works, Lamb Lane.

Tenders to be delivered to me, sealed and endorsed "Tender for Cannel," on or before the 10th day of March next. By order,

EDWIN ANDREW, Town-Clerk.

Salford, Feb. 26, 1874.

THE Directors of the Kingston-upon- Thames Gas Company invite TENDERS for the building of a BRICK GASHOLDER-TANK, 84 ft. diameter by 23 ft. deep.

The plans and specifications may be seen on and after March 2, 1874, at the Company's works.

Tenders to be sent in, addressed to the Chairman, not later than the 10th day of March, 1874.

The Directors do not bind themselves to accept the lowest or any tender. W. C. WATSON, Engineer.

TO TAR DISTILLERS AND OTHERS.

THE Directors of The Gaslight and Coke Company are prepared to receive TENDERS for the purchase of the TAR manufactured at their Kensal Green Station for One year, from the 1st day of July next.

The quantity estimated to be produced is 750,000 gallons.

Payments to be made monthly, in cash.

Proposals to be sent in on or before Thursday, the 12th prox., addressed to me, and endorsed "Tender for Tar."

The Directors do not bind themselves to accept the highest or any tender. By order,

JOHN ORWELL PHILLIPS, Secretary.

Chief Office, Horseferry Road, Westminster, S.W.,

Feb. 25, 1874.

CITY OF CARLISLE.

TO MANUFACTURING CHEMISTS AND OTHERS. AMMONIACAL LIQUOR.

THE Carlisle Gas Committee are prepared to receive TENDERS for the AMMONIACAL LIQUOR to be produced at their works for One year from March 31, 1874, to March 31, 1875.

Particulars may be had on application to the Manager of the works, to whom tenders, endorsed "Tenders for Ammoniacal Liquor," are to be delivered, on or before March 26, 1874. J. HEPWORTH, Manager.

Gas-Works, Carlisle, Feb. 6, 1874.

TRURO GAS-WORKS.

THE Directors of the Truro Gas Com- pany are desirous of receiving TENDERS for the ERECTION of a GASHOLDER, 50 ft. in diameter and 20 ft. 6 in. in height, and one of 65 ft. in diameter and 20 ft. 6 in. in height, stating separate price for each.

The drawings and specifications may be seen at the Office of the Company, or copies of the same may be had on application, on payment of £1 1s.

Tenders, endorsed "Tenders for Gasholders," must be sent to this Office on or before the 20th inst., and to state time required for completion of contract.

The Directors do not bind themselves to accept the lowest or any tender. J. HAMILTON, Secretary.

Truro, March 2, 1874.

SHIPLEY GAS-WORKS.

TO IRONFOUNDERS, GASOMETER MAKERS, AND OTHERS.

THE Directors of the Shipley Gaslight Company are prepared to receive TENDERS for the erection and completion of a TELESCOPE GASOMETER, 100 ft. in diameter, and 44 ft. in height, with 10 columns, girders, &c.

The drawings and specifications may be seen on application at the Office of the Company, Shipley, on and after Monday, the 2nd day of March, and sealed tenders must be sent, endorsed "Tender for Gasometer, &c.," on or before the 11th day of March, 1874, before Twelve o'clock at noon.

The Directors do not bind themselves to accept the lowest or any tender. By order of the Directors.

JOHN WILCOCK, Secretary to the Company.

TO GAS COMPANIES, ENGINEERS, MANAGERS, &c.

DESIGNS & PLANS of GAS-WORKS,

EXTENSIONS AND ALTERATIONS,

DRAWINGS AND TRACINGS OF GASHOLDERS,

TANKS, RETORTS, RETORT-HOUSE FITTINGS,

ROOFS, GIRDERS, CONDENSERS,

SCRUBBERS, ENGINES, BOILERS, EXHAUSTERS,

PURIFIERS, GOVERNORS, VALVES, &c.,

Prepared with despatch, and at a moderate rate.

HILL AND CO.,

23, Southampton Buildings, Chancery Lane, W.C.

SURPLUS PLANT FOR SALE.

TWO New Purifier Covers, 5 ft. 2 in. square, 15 in. deep—by Porter and Co., Lincoln.

1 new Rack Valve, 8 in.

1 Rack Valve, 6 in. 1 Screw Valve, 6 in. Both three years in use.

1 Cast-Iron Cistern, 12 by 12 by 15, with 3-in. sockets.

1 Cast-Iron Cistern, 18 by 18 by 18, with 2-in. sockets.

2 Cast-Iron Cisterns, 12 by 12 by 15, with 2-in. sockets.

1 Connexion for Scrubber, with Flange, 17 in.

2 Tees, 6 in. by 5 in., flange and socket; 1 Tee, 6 in. by 6 in.; 1 Tee, 7 in. by 5 in.; 1 Tee, 7 in. by 2 in.

5 Bends, 6 in.; 1 Flange Bend, 6 in.; 3 Bends, 5 in.; 2 Bends, 4 in.; 1 Syphon complete, 5 in.; 2 Syphons complete 2 in.; 2 Double Sockets, 6 in.; 2 Double Sockets, 7 in.; 1 Double Socket, 9 in.

8 Wrought Tramway Rails, 12 ft. each.

Apply to Mr. T. H. BOUTTELL, Manager, Gas-Works, SLEAFORD.

THE Scarborough Gas Company, owing to the removal of their works, will have FOR SALE, about October, 1874, the following APPARATUS, the whole of which is in exceedingly good condition:—

Fittings for 140 Retorts, consisting of mouthpieces, ascension, saddle, and dip pipes, and hydraulic and foul mains.

A Condenser, consisting of 40 12-in. pipes, with top and bottom boxes, and inlet, outlet, and bye-pass valves.

Two Scrubbers, each 7 ft. diameter and 16 ft. high, with valves as before.

Two Purifiers, 8 ft. 6 in. square and 5 ft. deep, 20-in. water lutes.

Two Cast-iron Water-Tanks, respectively 24 ft. by 16 ft. by 4 ft., and 20 ft. by 8 ft. by 4 ft. New in 1865.

Two Horizontal Engines, 4 h. p., two single-flue Cornish boilers, and two 20,000 feet per hour Beale's Exhausters. All new in 1866.

One Station-Meter, by Milne, 0,000 feet per hour. New in 1864.

One Gasholder 80 ft. diameter, in two 24-ft. lifts. About 11 years old.

One Gasholder 50 ft. diameter, in two 22-ft. lifts. Only 4 years old.

Two Governors, by Parkinson, on 12-in. and 10-in. mains.

A considerable length of 10-in. Cast-iron Socket and other Pipes.

An inspection of the above Apparatus is requested by the Officers of Companies requiring enlargements or extensions, and offers to purchase will be duly considered.

By order of the Board,

JAMES MOON,

Manager and Secretary to the Company.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

RETORT SETTING & WORKING.

AN ILLUSTRATED PAMPHLET,

By E. S. CATHELS.

To be had of Mr. W. B. KING, 11, Bolt Court, Fleet Street, London. Price 2s. 6d., post free.

WORKING DRAWINGS AND SPECIFICATIONS OF

CATHELS'S IMPROVED RETORT SETTINGS,

To be Heated by Coke, Tar, or Breeze.

For terms, apply to E. S. CATHELS, Gas-Works, Montreal, Canada.

GAS CONSUMERS MANUAL (Illustrated);

Or, HOW TO OBTAIN GOOD LIGHT & CHEAP GAS.

By E. S. CATHELS. Price 1s. 2d., post free.

LONDON: W. B. KING, 11, BOLT COURT, FLEET STREET, E.C.

EMILY GIBBONS,

Dibdale Fire-Clay Works & Colliery,

Near STAMBRIDGE.

(ESTABLISHED 1834.)

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields, Blast Furnace and other Bricks, and GAS-RETORTS.

Red and Blue Clay Goods, Engineering and other Ironwork, and Fittings supplied.

N.B.—Above works having been recently enlarged, orders of any magnitude for HOME or EXPORT Trade will receive immediate attention.

OMOA GAS COAL.

THE OMOA AND CLELAND IRON AND COAL COMPANY, LIMITED,

ARE NOW IN A POSITION TO

SUPPLY FROM THEIR PITS AT OMOA

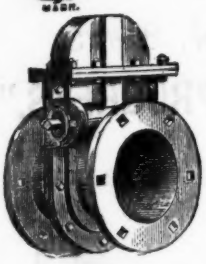
GAS COAL

OF A VERY SUPERIOR QUALITY.

This Coal, according to the report of the analyst, yields 11,110 cubic feet of gas per ton, and has an illuminating power of 33·97 candles per 5 cubic feet per hour.

Copies of the analysis and full particulars as to price, &c., may be had on application to the SECRETARY of the COMPANY, 172, West George Street, GLASGOW.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES



WITH WROUGHT-IRON PINIONS,

List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO, SCREW WATER-VALVES WITH GUN-METAL FACES.
ALSO SOLE MAKERS OF
J. BEALE'S NEW PATENT GAS EXHAUSTERS.

B. DONKIN & CO.,
GENERAL ENGINEERS AND IRONFOUNDERS,
MAKERS OF STEAM-ENGINES,
BLUE ANCHOR ROAD, BERMONDSEY,
LONDON, S.E.

STATION-METER.

THE Directors of the Warrington Gas Company have for sale a STATION-METER by West and Gregson, capable of passing 20,000 cubic feet per hour. Complete with clock, tell-tale, water-gauge and regulator, valves, bye-pass, and connexions. Discontinued in consequence of being too small.
Apply to JAMES PATERSON, Engineer.
Warrington, Feb. 9, 1874.

BOUCK & CO., LIMITED,
MANUFACTURING CHEMISTS,
TAR AND AMMONIA DISTILLERS, &c.,
MILES PLATTING, MANCHESTER.
WM. LITCHFIELD, SECRETARY.

CONTRACTORS for the PURCHASE of GAS TAR AND AMMONIACAL LIQUOR,
Also of their products.

LIME SUPERSEDED
IN THE
PURIFICATION OF ILLUMINATING GAS,
BY
Spence's Patent Dry Copperas,

The only Purifying Material which removes, by one process, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of four years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION.

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,
VICTORIA CHEMICAL WORKS, ASHTON NEW ROAD, BRADFORD, MANCHESTER,
Manufacturers of SPENCE'S PATENT DRY COPPERAS; GREEN COPPERAS;
SPENCE'S PATENT GAS DEODORIZER;
SULPHATE OF AMMONIA, GREY AND BROWN; SULPHURIC ACID; MUDIE'S DISINFECTANT, &c.
CONTRACTORS FOR THE PURCHASE OF SPENT OXIDE.
ALL COMMUNICATIONS TO BE ADDRESSED TO THE WORKS.

EDWARD COCKEY & SONS,
ENGINEERS, IRONFOUNDERS, & CONTRACTORS,
FROME SELWOOD, SOMERSETSHIRE
MANUFACTURERS OF
GASHOLDERS, PURIFIERS, CONDENSERS, SCRUBBERS;
ALSO OF
STEAM-ENGINES, EXHAUSTERS, IMPROVED PUMPS FOR TAR AND LIQUOR,
SLIDE-VALVES,
AND ALL DESCRIPTIONS OF APPARATUS USED IN GAS-WORKS.
PATENTEES AND MANUFACTURERS OF THE
DRY-FACED CENTRE-VALVES,
Which are now so extensively used.

During the last year these Valves have been introduced into some of the large gas-works in London, where they are giving the greatest satisfaction. Favourable reports have been received from the engineers of these and of some of the most important works in the kingdom. The demand for them both for home and foreign works continues unabated.

Every Valve is made with covering bars, to protect ALL the faces. The Patentees found the necessity for this almost immediately after they commenced the manufacture of these Valves, and they have ever since adopted the practice. The large experience they have gained has also enabled them to introduce several minor improvements in the construction of their Valves. It is an advantage peculiar to these Valves that the covers can be easily raised, the faces cleaned and oiled, and kept in perfect condition. If managers of gas-works will periodically attend to this, the Valves will be as good after twenty years use as when first put in.

Messrs. COCKEY AND SONS have been very successful in the erection of many gasholders, some of very large size. They erected, in 1871, at Dublin, for the Alliance Gas Company, one of the largest in the kingdom; telescopic, 182 feet 6 inches diameter. It was referred to by the Chairman of that Company the following year, in his report to the shareholders, as having been in use, and working most effectively, since its erection, and being in the highest degree satisfactory to the Company.

Plans of gas-works are carefully prepared, and every improvement which long practical experience can give is introduced into works entrusted to the care of the Advertisers.

References can be given to the Directors of many Companies who have placed works in their hands, and who will testify to the satisfactory results of so doing.

MR. WILLIAM DORE (19 years Gas Engineer and Accountant) may be CONSULTED upon all matters relating to the manufacture and distribution of gas, and the management, accounts, or transfer of gas undertakings.
Office, 4, Picton Place, Neath, SOUTH WALES.

Mr. ALFRED LASS,
60, CORNHILL, LONDON, E.C.,
Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.
To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.
To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

MR. NORWOOD EARLE, late of the Dover Gas-Works, is prepared, after 17 years experience, to undertake the duties of SURVEYOR to Gas Companies and Corporations in all matters relating to the Distribution of Gas and Gas Testing. Contracts entered into for the Survey of Mains, Services, Public Lamps, &c., in order to reduce the per centage of unaccounted-for gas to the lowest possible amount.
Valuations for Assessment, Transfer, and other purposes.
Offices, MANSION HOUSE CHAMBERS, 12, Queen Victoria Street, LONDON, E.C.

TO INVENTORS AND PATENTEES.
MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
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Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER.

Just published, price 10s. 6d.,
REGISTRATION OF DISTRIBUTORY PLANT.
The forms for this purpose are to illustrate the Paper on Distribution of Gas, read at the Edinburgh Meeting of the British Association of Gas Managers. By the use of the synopsis the whole of the out-door plant may at once be seen, with all matters pertaining to the same.
W. J. WARNER, Engineer.
South Shields.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

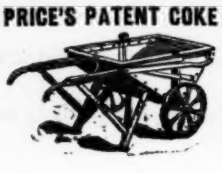
CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.
HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

TO GAS COMPANIES.
PATENT FUEL AND LIME CEMENT FROM GAS LIME.
This invention (protected by three patents) consists in a new method of turning the foul lime of Gas-Works to profit. The process is very simple and inexpensive, and can be worked by Gas Companies at a very small outlay.
By simply mixing the foul lime with tar it is converted in the first instance into an excellent fuel. By burning this fuel a very valuable material for building purposes is obtained, which can be used either as lime or cement or plastic. When used as cement it will be found equal to the best Portland in durability and hardness.
Licences to work the invention will be granted by the Patentee to Gas Companies on very reasonable terms.
For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

E. GODDARD,
GAS-WORKS, IPSWICH,
SOLE AGENT FOR
EDGE'S PATENT
FOR REMOVING THE
CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of
CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

PRICE'S PATENT COKE & COAL BARROW.

effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

THE PATENT
"UNIVERSAL" STEAM PUMP
WAS AWARDED, AT THE
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OPINIONS OF
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"The simplest machine of its kind."—*Engineering.*

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"None that we have noticed work so quietly."—*The Engineer.*

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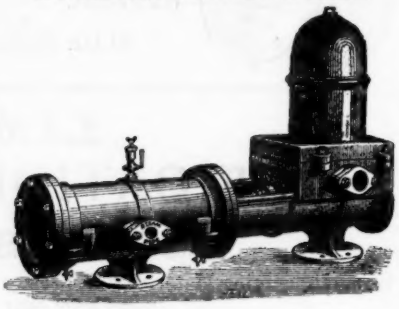
NO TAPPET VALVES OR GEAR.


IN USE IN SOME OF
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FOR
TAR AND AMMONIACAL LIQUORS.

One selected from amongst many Testimonials received by H. T. & Co.:—

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"Sir,—The 'Universal' Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily.
"Yours truly,
(Signed) "PETER HART, *Manager.*"

SOLE MAKERS,
HAYWARD TYLER AND CO.,
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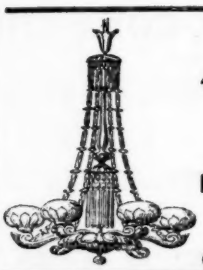
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MANUFACTORY AND SHOW-ROOMS:
BROAD STREET. BIRMINGHAM.
ESTABLISHED 1807.
MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,
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TABLE GLASS OF ALL KINDS.
CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

In the Press, and shortly will be Published, Second Edition, price 7s.,
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By THOMAS NEWBIGGING, A.I.C.E.

The scope of this work is apparent from its title. The First Edition, published a year or two ago was eagerly sought for, and has been now for some time out of print. The favourable reception accorded to it sufficiently proved that it supplied a generally acknowledged want in the profession. The New Edition will be published in fcap. 8vo., morocco, gilt. The work has undergone careful revision; much new matter has been added; and its form altered to suit alike the pocket and the desk. Every effort has been made by the Editor to increase its usefulness and render it worthy of the position it aspires to fill—that of an indispensable companion for all persons engaged in gas making.

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A Whole Page	£3 3 0
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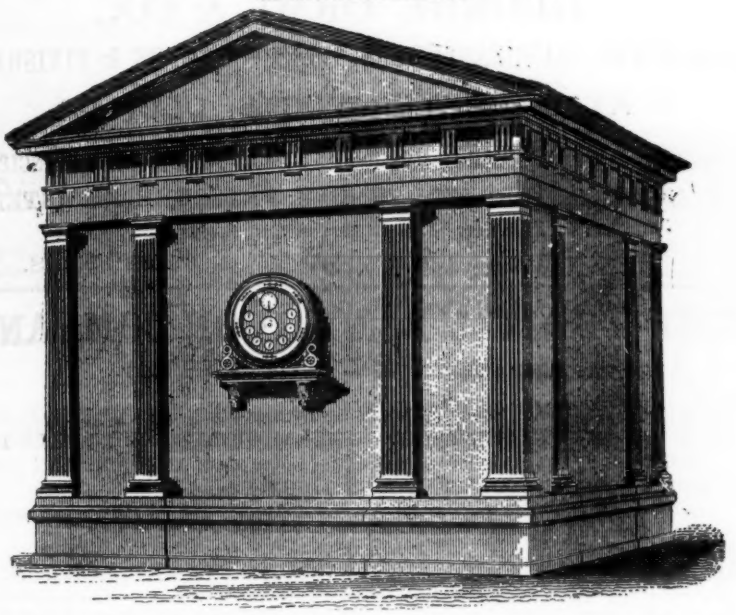
MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS

OF THE HIGHEST EXCELLENCE;

ROUND STATION-METERS,

ON CAST-IRON STANDS.



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WATER-METERS SUITABLE FOR ALL PRESSURES.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

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RETORT SETTINGS, heated by tar without the production of smoke.

STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

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A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains Illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

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WILLIAM FRASER,

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References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his

CELEBRATED HALBEATH STEAM COALS,

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Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

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SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
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DELIVERY F.O.B. ON CLYDE.
Lists on application.

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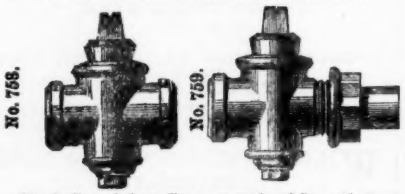
WITH PATENT WHITE METAL PLUGS.



The bodies of these Taps are made of Iron, black or galvanized, and the Plugs of Patent Metal. They are warranted not to set fast or corrode as do iron or brass Cocks, will always work easily, are strong, well made, durable, of little or no intrinsic value, and, therefore, not likely to be stolen; and the PRICES are (especially upon the larger sizes) FULLY 50 PER CENT. LESS THAN BRASS COCKS.
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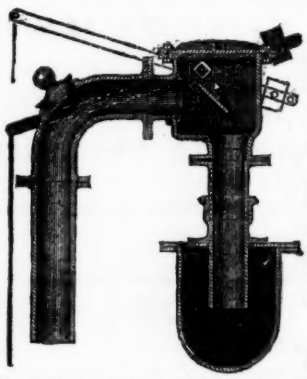

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By the adoption of this Valve, which is neat, cheap, and most effective, the necessity for a dip-pipe, together with liquid, in what is now the hydraulic main, is superseded, and the pressure consequent upon the dip entirely removed, a desideratum which has been sought for by so many engineers of late.
It will be seen that the Valve can be applied direct to the existing main, but should it be desired to retain the present dip-pipes, the connexion can be easily made by inserting a flanged and spigot piece, as shown in the illustration.
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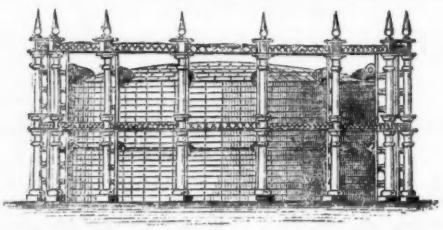
GAS-WORKS, CRAYFORD, KENT.

HOPE IRON WORKS,



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GAS APPARATUS OF EVERY DESCRIPTION,
Including Improved
Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,
And GENERAL IRONWORK.
N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

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OF
WIGAN COAL AND CANNEL,
From the Mines of the
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Messrs. W. H. BRANCKER & Co.

POPE & PEARSON'S GAS COAL.—
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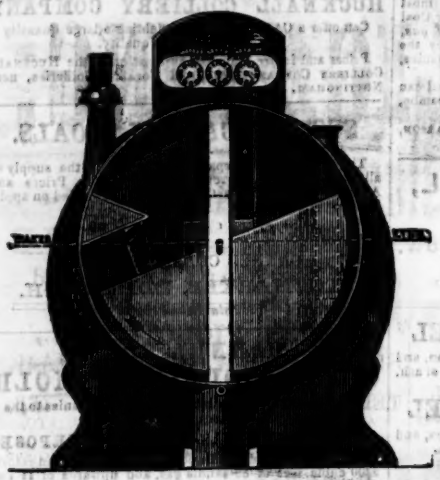

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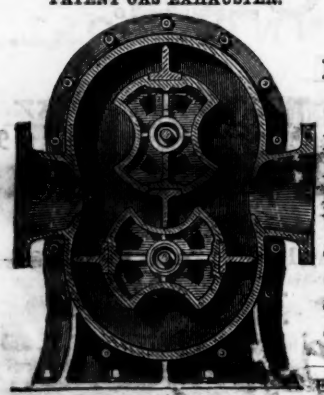

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